Reglue old chair joints with pro restorer Bob Flexner Page 39

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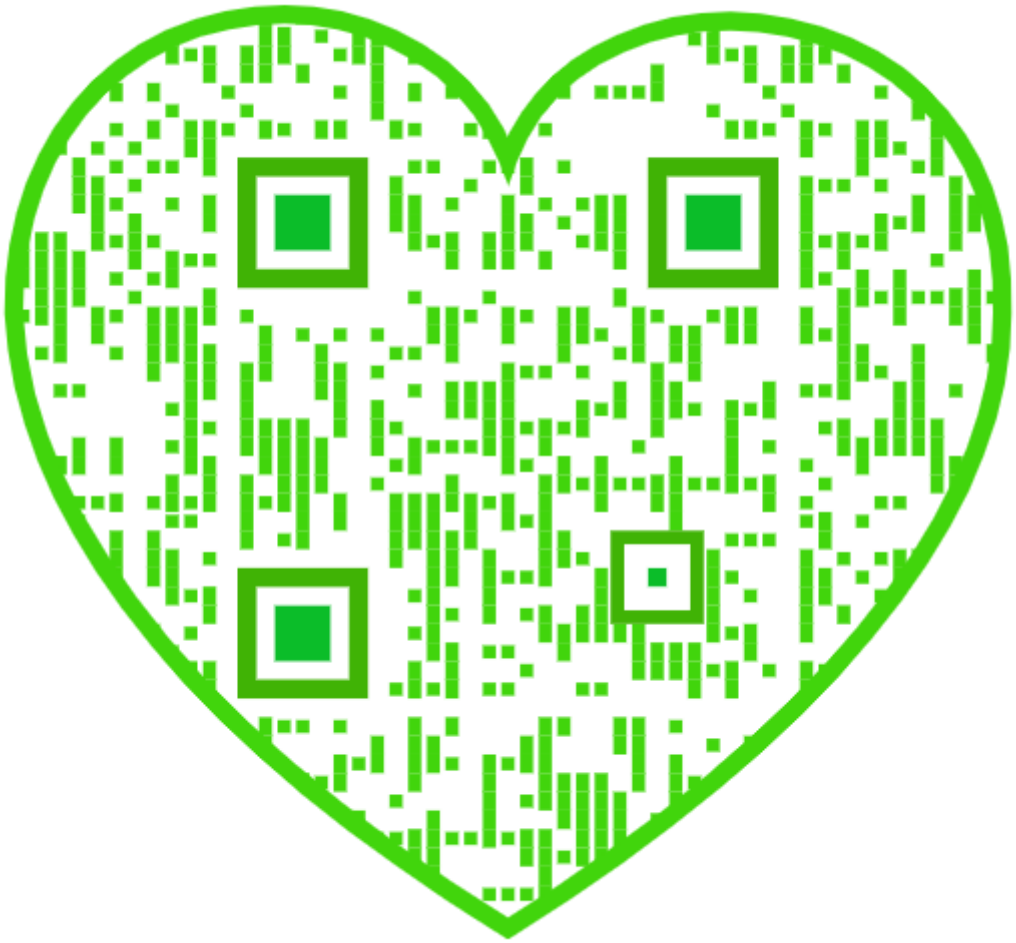

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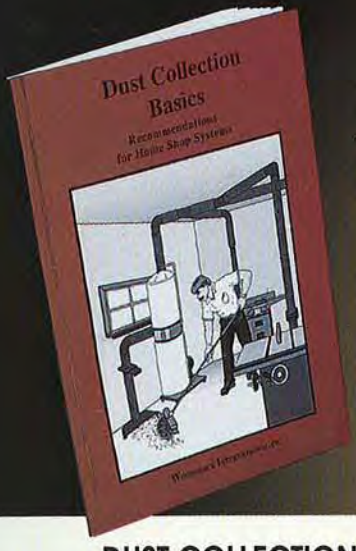

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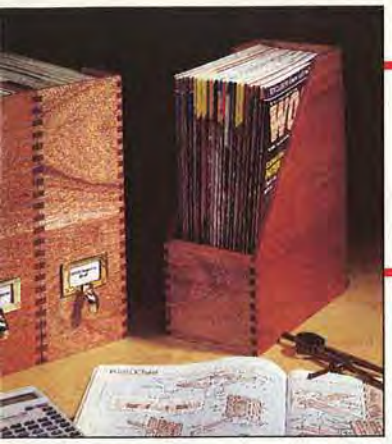

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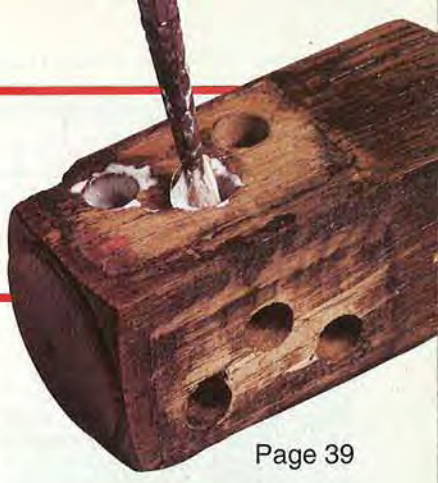

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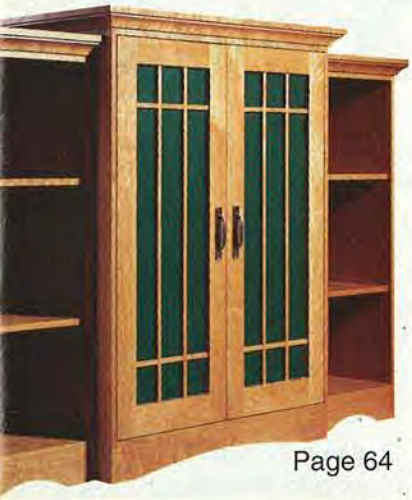

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THE EDITOR'S ANGLE

Build-a-Gift™

Help us help kids

Enter Our Great New Contest

As regular readers of this magazine know, we ended our successful Build-A-Toy® contest this year with mixed emotions. But when the opportunity arose to continue our sponsorship of the Marine Corps Reserve's Toys for Tots program, we jumped at the chance. So did several of our advertisers when we asked them to participate in our latest effort—Build-A-Gift. So here we are.

This contest differs from our Build-A-Toy contest in a couple of ways. First, the items you submit can range from a jewelry box to a beautiful turned vase, toy, or holiday decoration, to name just a few. In other words, the categories are wide open, as long as the project can fit into a 2×2×2' box.

Second, with this contest, you have more categories to enter. (See *pp. 86-87* for the prizes and the official rules.)

The deadline for entries is November 30, 1998. So if you want to do something to help a needy child this Christmas, tie on your shop apron and start making some sawdust pronto! Who knows, you may win one of the great prizes being offered, perhaps even the 1999 Dodge Dakota pickup.

As in the past, a panel of judges will select the winners, in this case by December 15, 1998. Then, we'll auction off the entries to raise as much money as possible. And after the proceeds have been tallied, we will purchase as many toys as the money will buy, and we will turn them over to the Marine Corps Reserve for distribution.

Here's hoping that many of you decide to enter. It'll be fun and fulfilling for you.

Thanks for your support.

Larry Clayton

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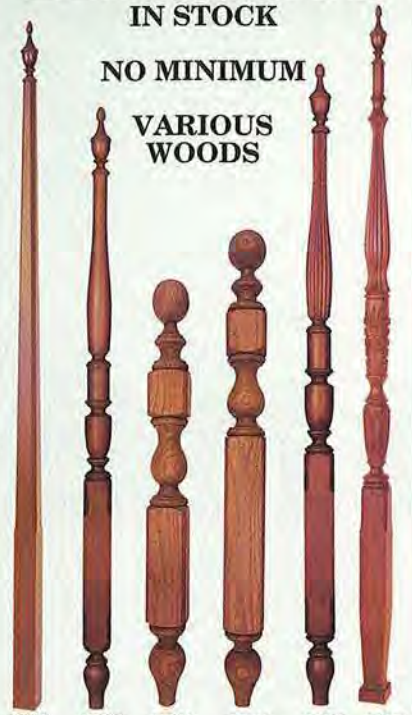

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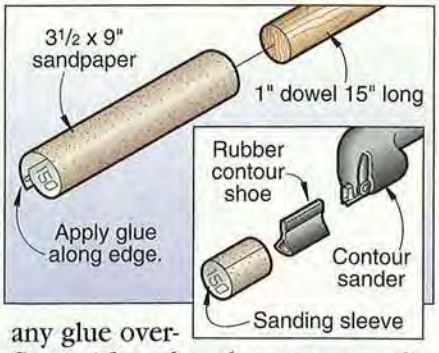
TALKING BACK

A better way to replace sanding sleeves

I read with interest your recent article on the Dremel contour sander from issue #102. I lost interest in this tool when I discovered replacement sanding sleeves are $6-$8 for just five. I found myself using the tool less frequently until I devised this way to make my own sleeves.

First, cut a 3½" strip off a 9"-wide sheet of sandpaper. Then run a fine bead of yellow glue along the inside edge, and wrap the sandpaper tightly around a 1" dowel about 15" long. Don't use too much glue, or it'll squeeze out and stick the paper to the dowel. Now, while holding tight, roll this into a sheet of wax paper. I stretch several rubber bands folded over and criss-cross to hold the sandpaper and dowel in place. After ten minutes, give the dowel a twist to free it from any glue overflow. After the glue sets up, slip the paper off the dowel, and cut into 2⅛" lengths.



One sheet of sandpaper gives me a dozen sanding sleeves for about 25 cents. I've also made my own sleeves with wet/dry paper, and emery cloth for other purposes.

—Marty Martens, Nanaimo, British Columbia, Canada

Great idea, Marty. We'd like to add this idea: by putting some finish on the dowel, you won't have as many problems with glue sticking the sandpaper to the dowel.

Aniline advice from a pro

I read and enjoyed your article about aniline dyes in issue #104. That is, until the final sentence when you mentioned that any clear finish can be applied to wood dyed with anilines. This statement could lead readers into tragic finishing experiences.

Different aniline dyes dissolve in different solvents — water, alcohol, and oil. You use distilled water as a solvent for water dye, denaturated alcohol for alcohol dye, and mineral spirits or lacquer thinner with oil dye. Adding or weakening the solvent of an aniline dye solution lets you control the color. But when you apply a clear finish to dyed wood, *you can not use a finish that has the same base as the dye's solvent.* For example, using water-based polyurethane over a water-based aniline dye will cause the dye to bleed into the clear coat and muddy the finish. Always use a solvent for your aniline dye that is different than the base of your finish.

—Sal Marino of Constantine's Woodworker's Catalog, Bronx, N.Y.

Let us know what's on your mind

We welcome your comments, criticisms, suggestions, and yes, even compliments. We'll do our level best to publish letters of the greatest benefit to all our readers. Write to us at: Talking Back, *WOOD* Magazine, 1716 Locust Street, GA310, Des Moines, IA 50309-3023.

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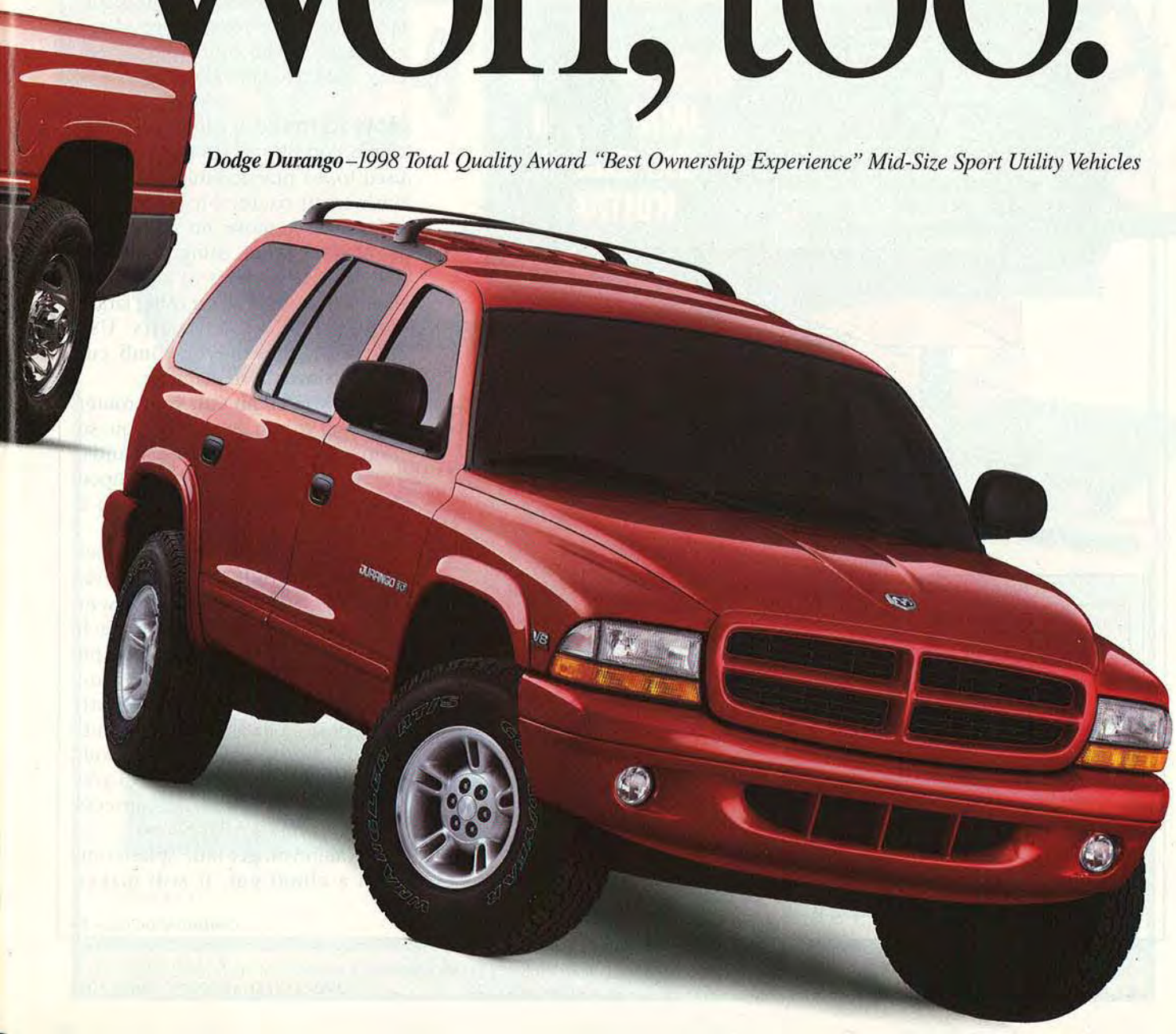
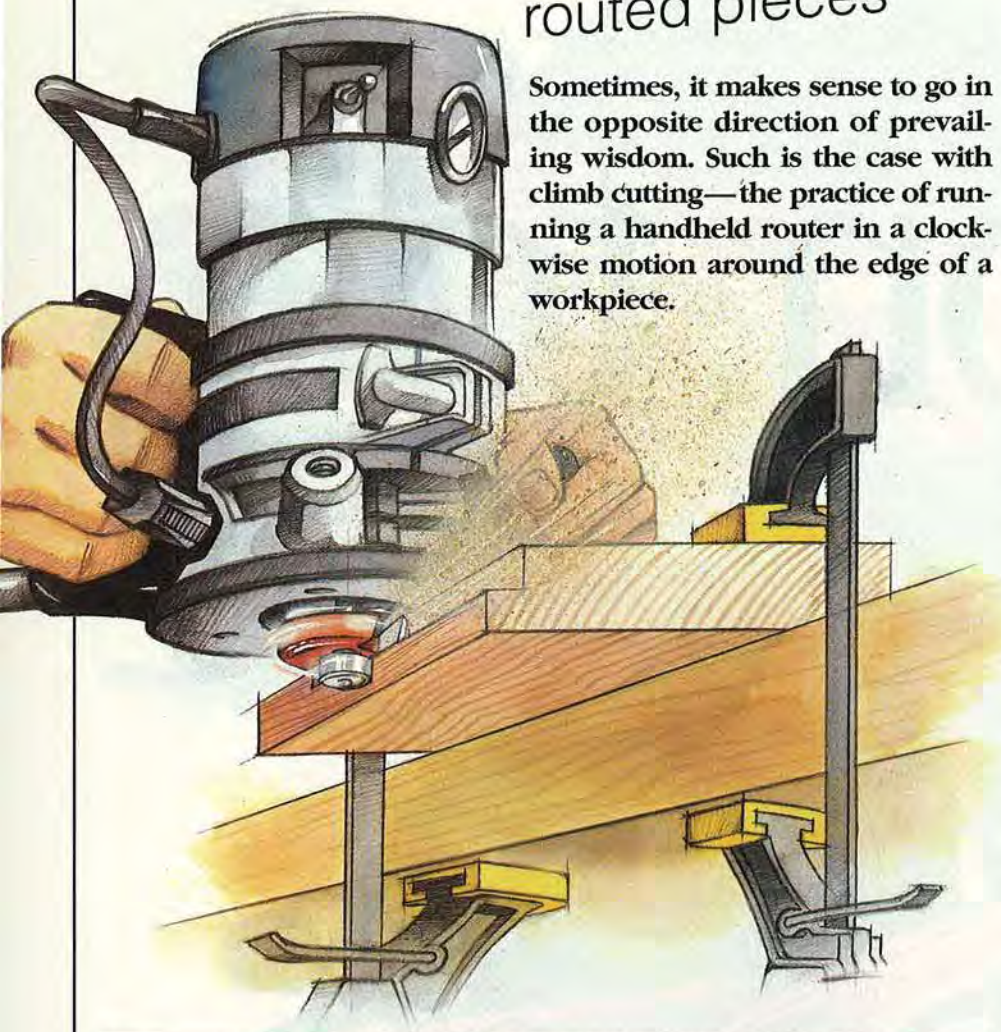
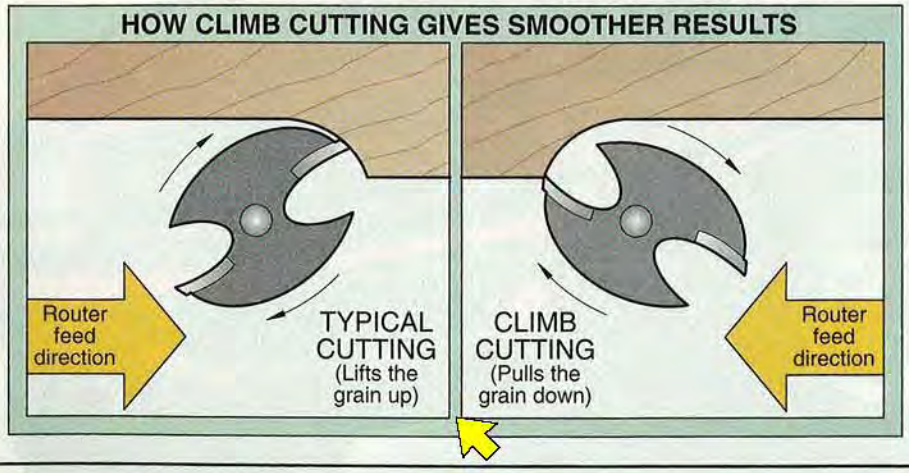


Climb Cutting

A good way to up the quality of your routed pieces

Sometimes, it makes sense to go in the opposite direction of prevailing wisdom. Such is the case with climb cutting—the practice of running a handheld router in a clockwise motion around the edge of a workpiece.





How this procedure gives you smooth routed edges

As shown at *bottom*, when you feed a router in the "typical" (counter-clockwise) direction, the bit's cutting edges lift the grain of the workpiece. But, in a climb cut, the bit pulls the grain down as its cutting edges enter the workpiece.

So, with a climb cut you don't get the splintering that you often get with a bit fed counter-clockwise. And, climb cutting has a burnishing effect on the wood, leaving an exceptionally smooth routed surface. For those reasons we climb cut most of the time we rout an edge with a handheld router.

How to make a climb cut

Climb cutting takes a little getting used to, so practice this technique with small router bits and scrap softwood. Remove no more than ⅛" of stock when using small bits, and restrict yourself to about 1/16" of stock removal when using larger bits such as ½" cove bits. Use sharp bits, and never climb cut with bits over 2" in diameter.

When you climb cut, your router will want to run away from you, so hold on firmly with both hands. The workpiece should be clamped down—not simply sitting on a router mat.

Because a climb-cutting bit does not tend to pull into the workpiece, you don't have to lower your bit to increase its cut for each successive pass. Simply set the bit to its full cutting depth and remove a little more stock with each cutting pass. You'll be surprised at how quickly you can rout edges, and how much control you have over this "freehand" process provided you take light cuts.

Although you get little splintering with a climb cut, it still makes

Continued on page 10

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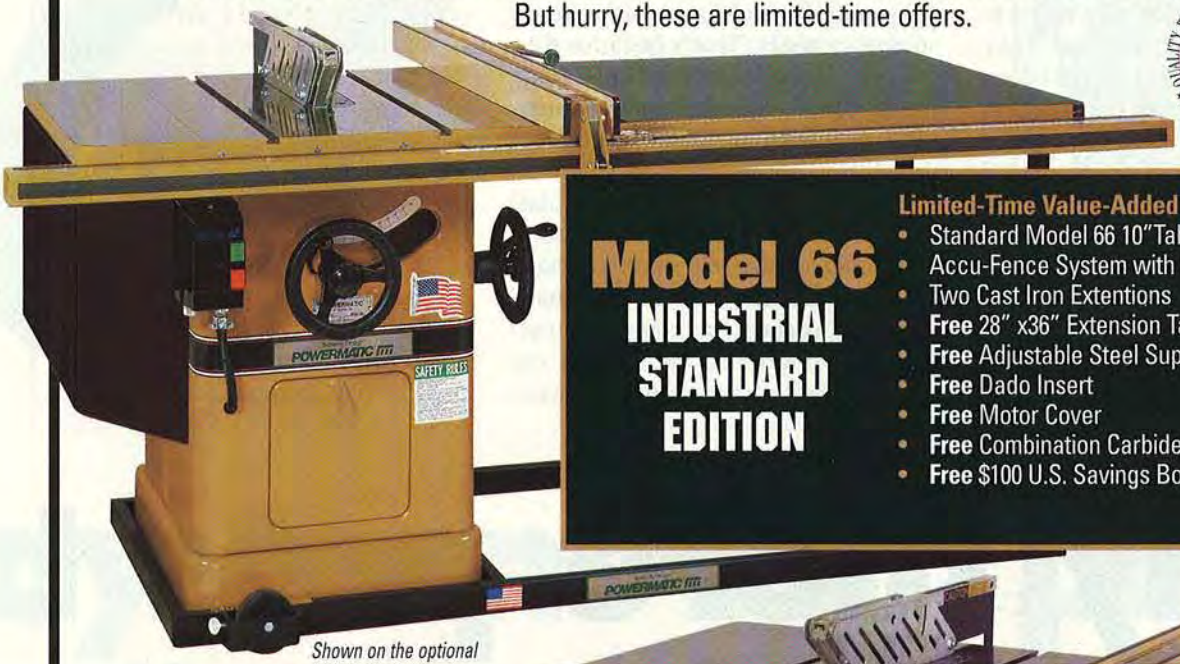

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Continued from page 8

sense to follow the traditional wisdom of routing the ends of a workpiece before routing the edges. If you see some "fuzzing" of the grain when you climb cut, you probably have a dull bit. (Some woods, such as butternut and willow, will fuzz even with sharp bits.)

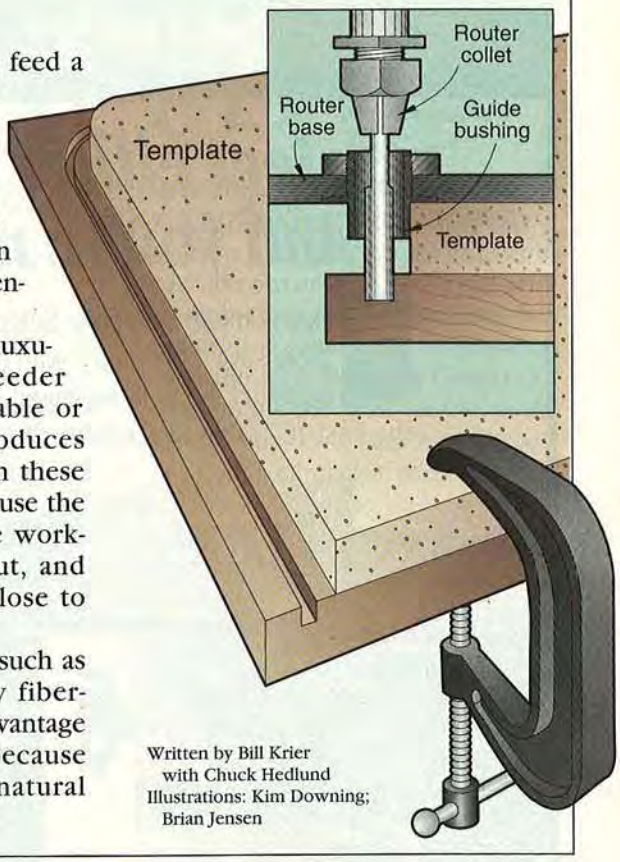
When *not* to climb cut

Under many circumstances, it still makes sense to feed a router in a counter-clockwise direction. That's because a bit fed that way tends to "pull" into the workpiece, template, or straightedge that you guide it against. This tendency to "hug" whatever you guide the router against serves you well when it's essential that the router not wander off course. For example, when cutting a dado, or the groove for holding a tambour door in the example *right*, the cut must follow its guiding edge exactly.

And, remember to always feed a workpiece in the typical right-to-left direction when using a router table. If you try to climb cut, the bit will pull the workpiece away from you, creating an unsafe situation, not to mention poor-quality cuts.

However, if you have the luxury of owning a power feeder mounted to your router table or shaper, climb cutting produces silky-smooth moldings with these stationary tools. That's because the power feeder controls the workpiece for a rock-steady cut, and your hands never come close to the cutting edges.

With man-made materials such as Corian or medium-density fiberboard (MDF), there's no advantage to climb cutting. That's because these materials have no natural grain that might tear out.



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PECAN Hickory's nuttiest cousin

Some trees become known for attributes other than their wood. The shapely crown of the American elm, for instance, far exceeds the reputation of its boards. And so it is with the pecan tree (*Carya illinoensis*).

A cousin of the hickories, the pecan was notable for its sweet nuts long before the coming of white explorers. The Indians of the Lower Mississippi River Valley were so thankful for its nutty bounty that they associated the tree with the Great Spirit.

Spanish explorer and gold seeker Hernando DeSoto discovered the pecan when his party crossed the Mississippi River in 1541. According to his chronicles, the Spaniards relished the nuts from the trees because of their comparatively thin shells. But DeSoto wasn't a horticulturist, and failed to bring back samples.

The American trappers and traders of later centuries were more enterprising. From their excursions in the new frontier west of the Allegheny Mountains, they returned with furs to sell and pecan nuts to share. Thomas Jefferson heard of these "Mississippi nuts" and got some to plant at Monticello. He also gave some to his agriculturist friend, George Washington, who set them in a row at Mount Vernon.

That began the extensive propagation in the United States of the pecan as a nut tree. Today, cultured varieties of the species occupy orchards from Georgia to California and Oregon.

And what of the wood? The hard, strong, close-grained stock is valued for veneer and chairs. But throughout the South, it's the pecan nut of praline fame that draws the most applause.

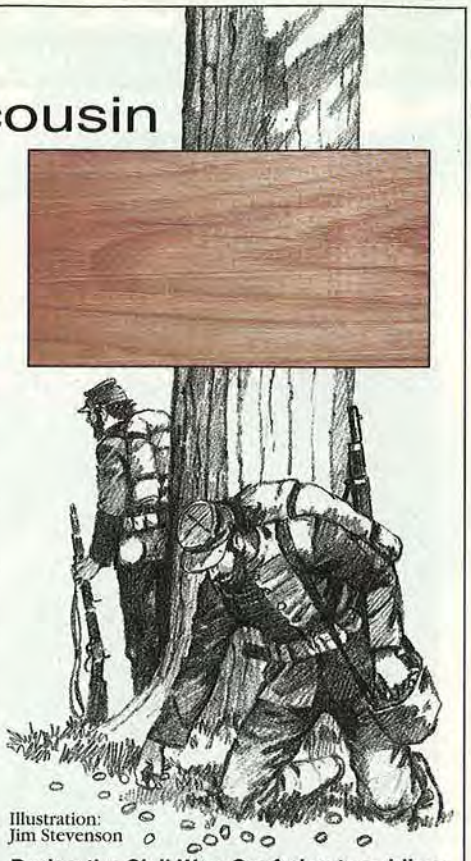

Illustration: Jim Stevenson

During the Civil War, Confederate soldiers could always rely on a snack of pecan nuts stashed in their knapsacks.

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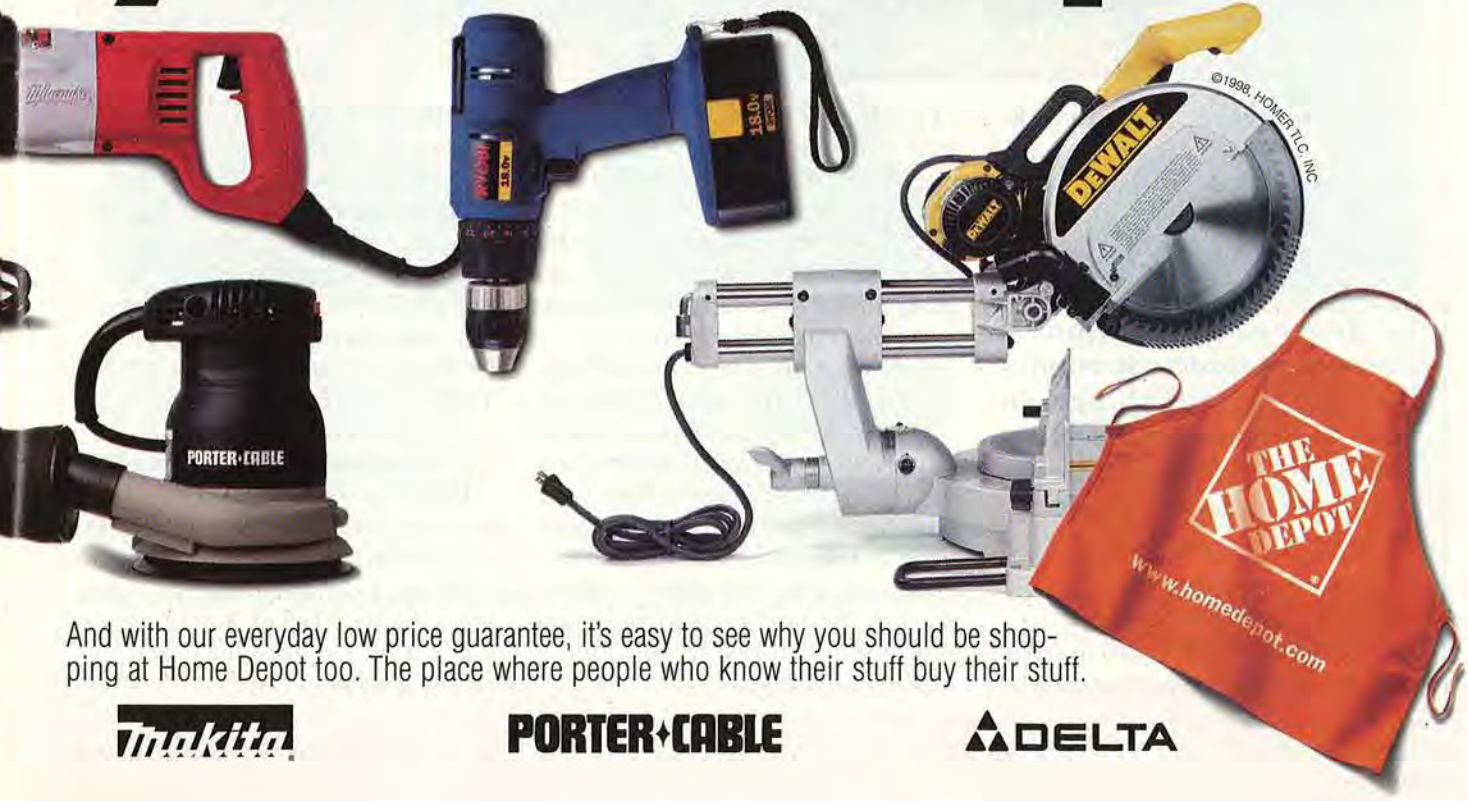

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JUST ADD WATER

For sharper tools, try waterstones

Keep the stone's surface wet as you sharpen. A sharpening guide helps avoid gouging the surface.

More and more woodworkers are finding that the path to perfectly sharpened edge tools leads them through water. For that's what lubricates the increasingly popular Japanese waterstones. These man-made whetstones offer a big advantage in sharpening tools—an abrasive surface that constantly renews itself as you work.

Why waterstones outsharpen oilstones

A waterstone's soft abrasive particles break off in use, constantly, exposing new, sharp edges. As you continue sharpening, those broken-off crystals crumble into smaller and smaller pieces. The crumbled crystals mix with the water on the stone's surface, creating a slurry—in effect, a honing and polishing compound.

Compare this with what happens to the hard abrasive particles which make up many other kinds of whetstones. Instead of breaking off through use, they round over and become dull. At the same time, oil residue and metal particles pack into the stone's pores, glazing the surface and reducing the stone's ability to produce a really sharp edge.

Study this for a good grade

Japanese waterstone grades cover a range from 150 to 8000 grit, but those numbers don't relate directly to U.S. grades. For example, the abrasive action of a Japanese 150-grit stone approximates a 100-grit U.S. one; the Japanese 1000, a U.S. 500; and the Japanese 4000, a U.S. 1000. It's better to relate waterstone grades to each other than to try converting them to U.S. grades.

Here are some points that will help you when buying waterstones:

- To remove a lot of metal fast, for restoring a damaged edge or changing a blade's bevel, for instance, you'll want a waterstone in the 150- to 250-grit range.

Continued on page 17

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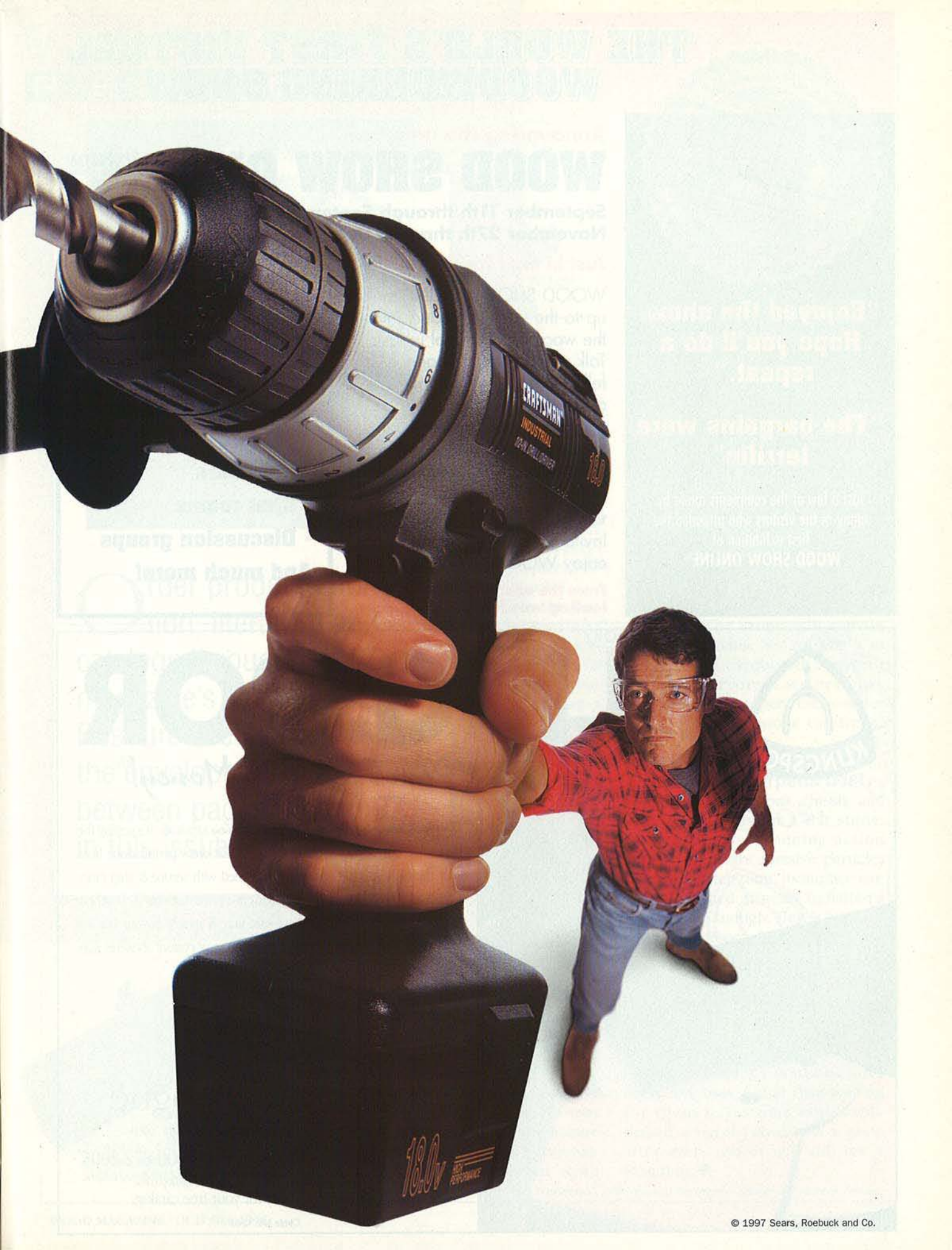

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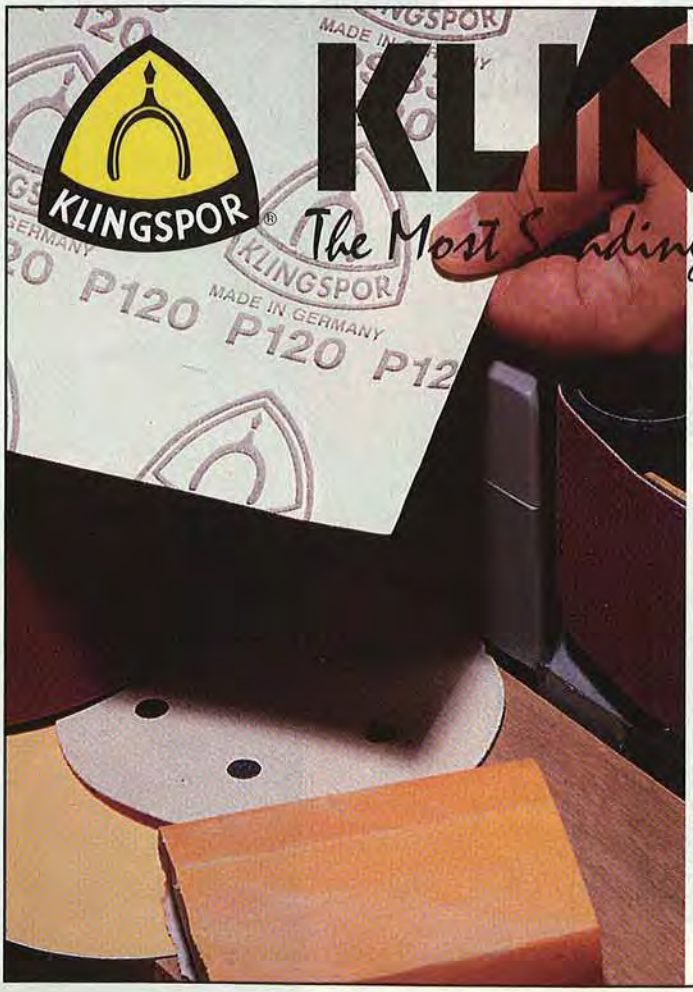

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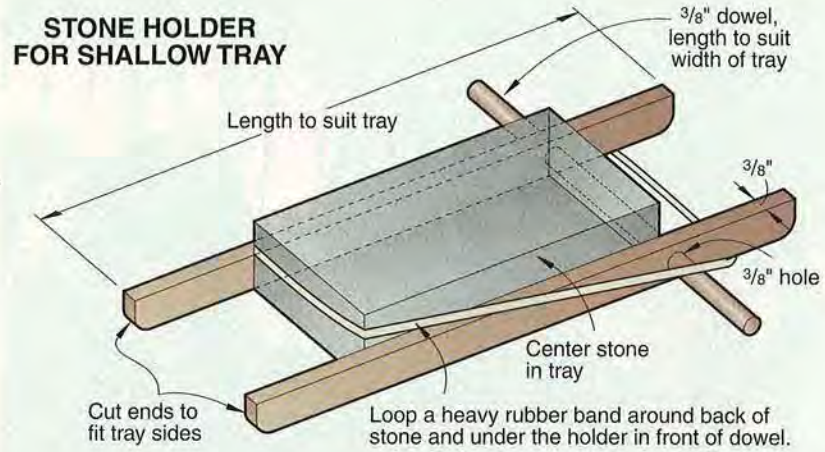
STONE HOLDER
FOR SHALLOW TRAY
3/8" dowel, length to suit width of tray
Length to suit tray
3/8"
3/8" hole
Center stone in tray
Cut ends to fit tray sides
Loop a heavy rubber band around back of stone and under the holder in front of dowel.

Contain the sharpening mess with a shallow tray, such as a cookie pan. Other useful items include (clockwise from top) a plastic box for stone storage, a water bottle to rewet the surface periodically, a tray for soaking the stones, and a sharpening or honing guide (shown holding a plane iron ready for sharpening).

•You can count on an 800-, 1000-, or 1200-grit waterstone for general-purpose sharpening. The 800-grit stone is a good all-around choice if you sometimes have to sharpen nicked or heavily used edges.

•For honing and polishing a sharpened edge, select a 4000-grit or finer stone, sometimes called a finish stone.

•A pair of stones will suffice for normal tool sharpening—an 800, 1000, or 1200 and a 6000 or 8000. If you often deal with damaged edges, add a more aggressive 150- or 250-grit stone to your set.

•Individual waterstones cost from $20–$40 on average, with some ultrafine (8000-grit) finish stones running as high as $75. You can buy combination stones, with a coarser grit on one side and a finer one on the other, for $25 to $50.

First, whet the stone's thirst

Waterstones are intended to be used wet. So before sharpening, soak the stone for 10 to 15 minutes in clean water. (We bathe ours in a drywall-compound tray, shown *above right*. You can use any small pan deep enough to submerge the stone in.) While sharpening, keep the stone's surface wet. (We squirt water on the stone from a bicyclist's water bottle; any squeeze or spray bottle would do the job.)

All the water, along with the slurry of abrasive and steel particles that forms on the stone's wet surface, makes sharpening messy. To contain the mess and protect your benchtop, place the stone on a cookie pan or similar shallow tray. Hold the stone in the center, using spacer blocks or a simple fixture like the one shown in the illustration and *opening photo*.

For better sharpening and to protect the stone from accidental gouging, always hold the tool in a sharpening or honing guide, as shown in the *opening photo*.

Dry your stone for storage

Some woodworkers store waterstones in water-filled buckets or plastic boxes. That's okay for coarse and medium stones, but not for fine-grit finish stones. They should be stored dry.

We prefer to store all waterstones dry—or maybe damp would be a more accurate adjective. It's less hassle: You don't have to stash sloshy boxes of water in your shop, and you won't end up growing odd organisms if you fail to change the water often enough.

After use, just rinse the stone, pat it dry, and stick it into a lidded plastic box. (The stone will remain damp for a while, so keeping it in the original cardboard box isn't practical.) Protect waterstones from freezing temperatures—water that remains in a stone can freeze and crack it.

A flat stone sharpens best

Sharpening plane irons, chisels, and other tools calls for a flat stone. But, because sharpening action constantly shears abrasive particles from the waterstone, its surface can become dished. It's easy to flatten a stone again, though. Here's how:

Place a piece of 120-grit wet-or-dry sandpaper, abrasive side up, on a piece of glass or some other true, flat surface. Wet the sandpaper, then rub the stone on it in a figure-8 motion. Check the stone's face with a straightedge.

Flatten your waterstones after every few uses, rather than waiting for them to become noticeably dished. Even if you flatten a stone after every use, it will still last a long time.

Some waterstones, like the 6000-grit finish stone, come mounted on a wooden base. Also shown, a general-purpose 800-grit waterstone.

Photographs: Hetherington Photography Illustration: Roxanne LeMoine

Playing the Insurance Game

Woodworkers pose a risk for insurance purposes, but you can take steps to lower it

Woodworking is risky business. In an insurance company's view, combining sawdust, products made of wood, hazardous and flammable glues and finishes, and electrical machinery that can generate sparks makes an explosive situation that many insurers want to avoid. And keep in mind that most homeowners' policies limit coverage to $2,500 for business-use items on premises and $250 away from home. So for protection, separate business coverage is a must. But most professional woodworkers have trouble getting property insurance and sometimes casualty, liability, or even health and life insurance at reasonable rates.

Some woodworkers take chances without insurance

In Ohio, Ray Murray makes bunk beds and children's play forts in addition to less risky furniture. He can't find a company to provide product liability insurance for the beds, and the premium for play sets is so high he goes without. Instead, Ray has customers sign liability waivers. Then, he hopes nothing goes wrong.

Worse still, when Ray's health insurer found out that he was a woodworker, the company canceled him. Once canceled, he couldn't find other coverage, except for a health maintenance organization required by state law to enroll anyone (albeit at a rate of over $700 a month).

Fortunately, things can sometimes get better. David Smith, a woodworker with manufacturing and retail operations in Ohio and Florida, found insurance coverage expensive when he started more than a decade ago. Now, with a larger business and a good track record, David has reasonable rates from a major carrier, Nationwide Insurance (800/421-1444).

To impress carriers, reduce risks

Woodworkers looking for insurance can reduce risks to increase the chances of finding some at reasonable rates, according to Chris Kendall, administrative manager for commercial lines at Cincinnati Insurance Cos. (call 513/870-2000 for referral to an independent agent). His company covers woodworkers and other small businesses across the nation. He suggests the following steps to help obtain insurance:

- Ground all electrical equipment and buildings.
- If you smoke, quit, and don't let anyone in your shop smoke.
- Keep a clean shop. Proof of janitorial service helps.
- Spray or paint in an appropriate booth or have it done.
- Use dust-collection equipment.
- Store flammable and hazardous materials in locked cabinets away from sources of combustion. Keep paperwork, such as receipts from licensed hazardous waste haulers or dumps, to prove you dispose of hazardous materials properly.
- Keep your inventory of expensive woods to a minimum. If possible, store wood in a building separate from the workshop, just in case of fire.
- Reduce your liability by keeping customers out of your shop. Do business in a separate room.

Many of these steps are expensive. But the trade-off for not spending money on safety is paying higher insurance rates or simply going without insurance.

Written by Jack Neff, a Batavia, Ohio, business writer and author of *How to Make Your Woodworking Pay for Itself.*
Photograph: John F. Schultz

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John Gottschalk finished as our Top Shop Tip winner for his method of attaching a dust-collection hose.

A carpenter by trade, John Gottschalk now has a desk job as project superintendent for a contracting firm. But you won't find him sitting around in his free time. When he gets home, he supervises his own wood projects and farms 80 acres of land near Hemlock, Michigan.

John describes himself as "time-poor," but he's banked enough hours to build projects ranging from a Burmese teak coffee table to a walnut humidor with lacewood inlays. His need for speed led him to create the quick-disconnect hose clamps, *right*.

If you've come up with a time-saving solution for your shop, it may be worth $40. In each issue we pick one tip as our Top Shop Tip, and if it's yours, you'll win a tool prize valued at $250 or more. To submit a tip, send a letter, with your daytime phone number and a photo or drawing of your idea, to:

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Dave Campbell
GENERAL-INTEREST EDITOR

Clamps team up for quick dust disconnect

Top Shop Tip submitter John Gottschalk receives a Ryobi WDP1850 Wood Drilling System for his efforts. Nice job, John!

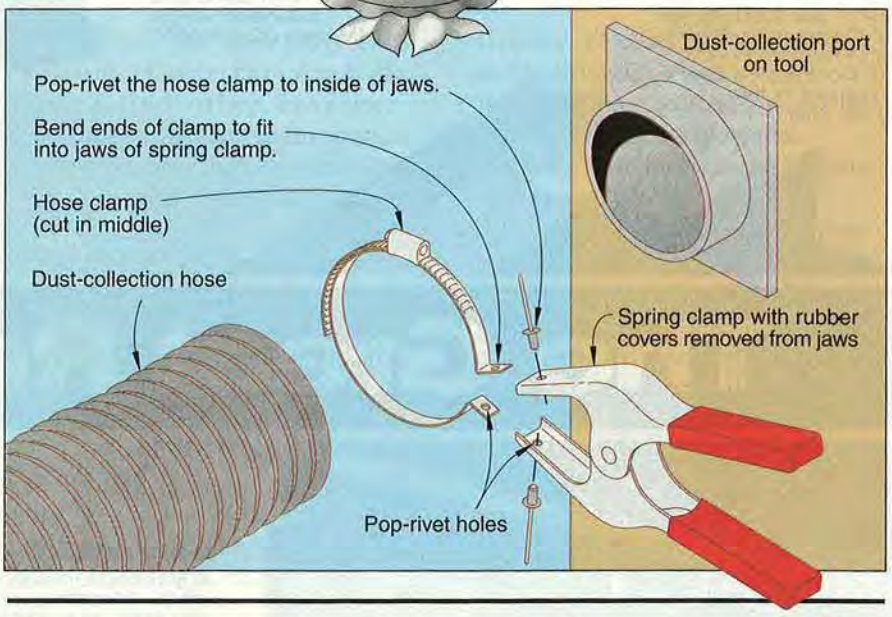
In my small shop I have to move the larger stationary tools out of the way when I'm not using them. That means I am always connecting and disconnecting dust-collection hoses from my equipment.

I needed a hookup I could quickly secure and separate, so I made my own from a steel spring clamp and a hose clamp from an auto parts store. After cutting the hose clamp in the middle, I pop-riveted the cut ends to the jaws of a spring clamp.

Now, I squeeze the jaws open, slip the clamp over the dust hose, and release the jaws. My invention holds the hose fast and, because the threads of the hose clamp are still intact, I can adjust the tension or size as needed.

—John Gottschalk, Hemlock, Mich.

TOP SHOP TIP


Pop-rivet the hose clamp to inside of jaws.
Bend ends of clamp to fit into jaws of spring clamp.
Hose clamp (cut in middle)
Dust-collection hose
Dust-collection port on tool
Spring clamp with rubber covers removed from jaws
Pop-rivet holes

Paint roller cover makes a great contour sander

The graceful curves of some projects aren't well suited to sanding with a power contour sander. To sand these contours, I wrap a piece of sandpaper around an old (but still soft) paint roller cover. The nap of the roller gives plenty of cushion and contours itself to the workpiece. Use a 4"-long roller, or cut a longer roller to fit. For tighter curves, use a smaller-diameter trim roller.

—Jan Svec, Assistant Design Editor, **WOOD *magazine***

Continued on page 22

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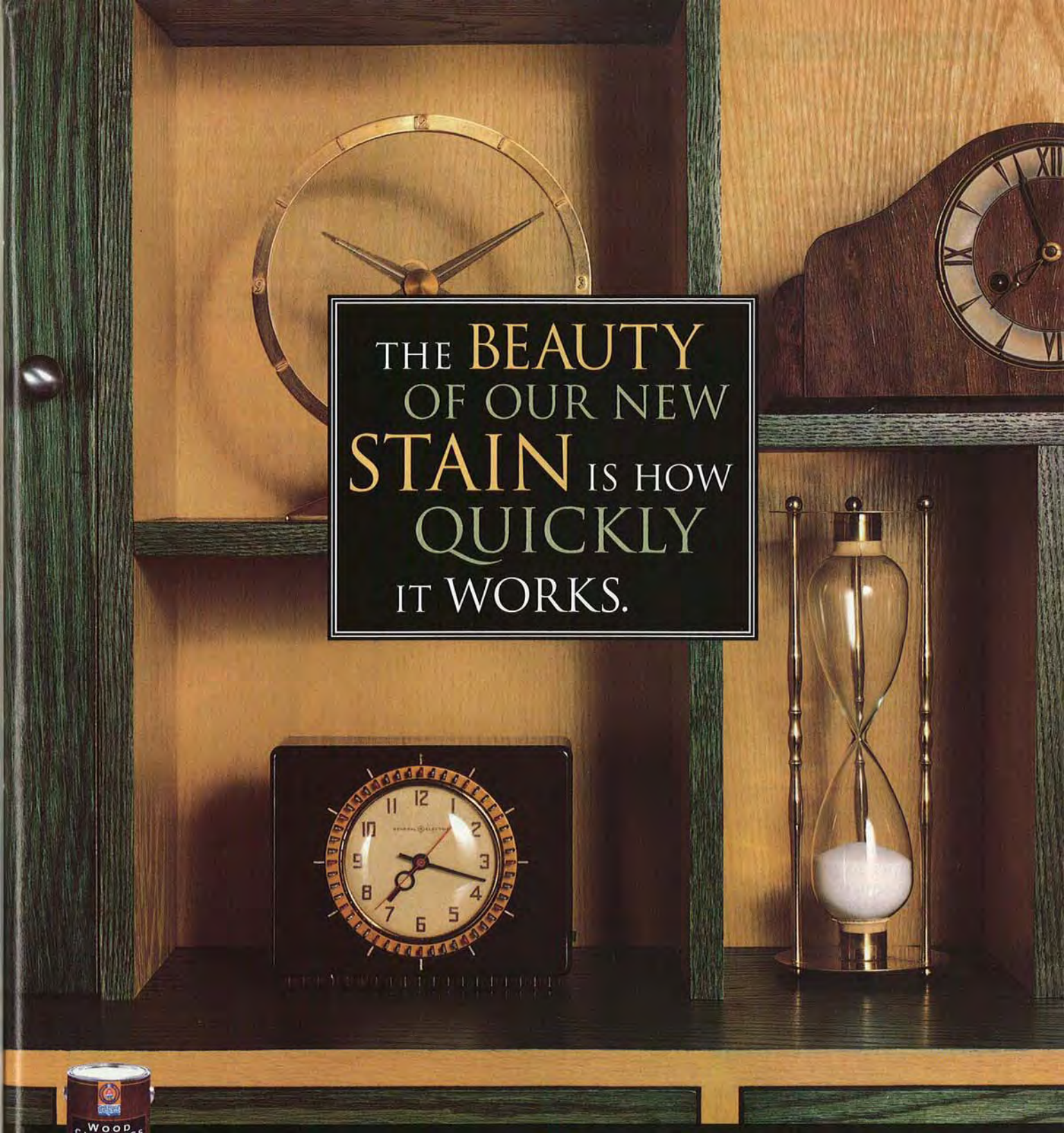

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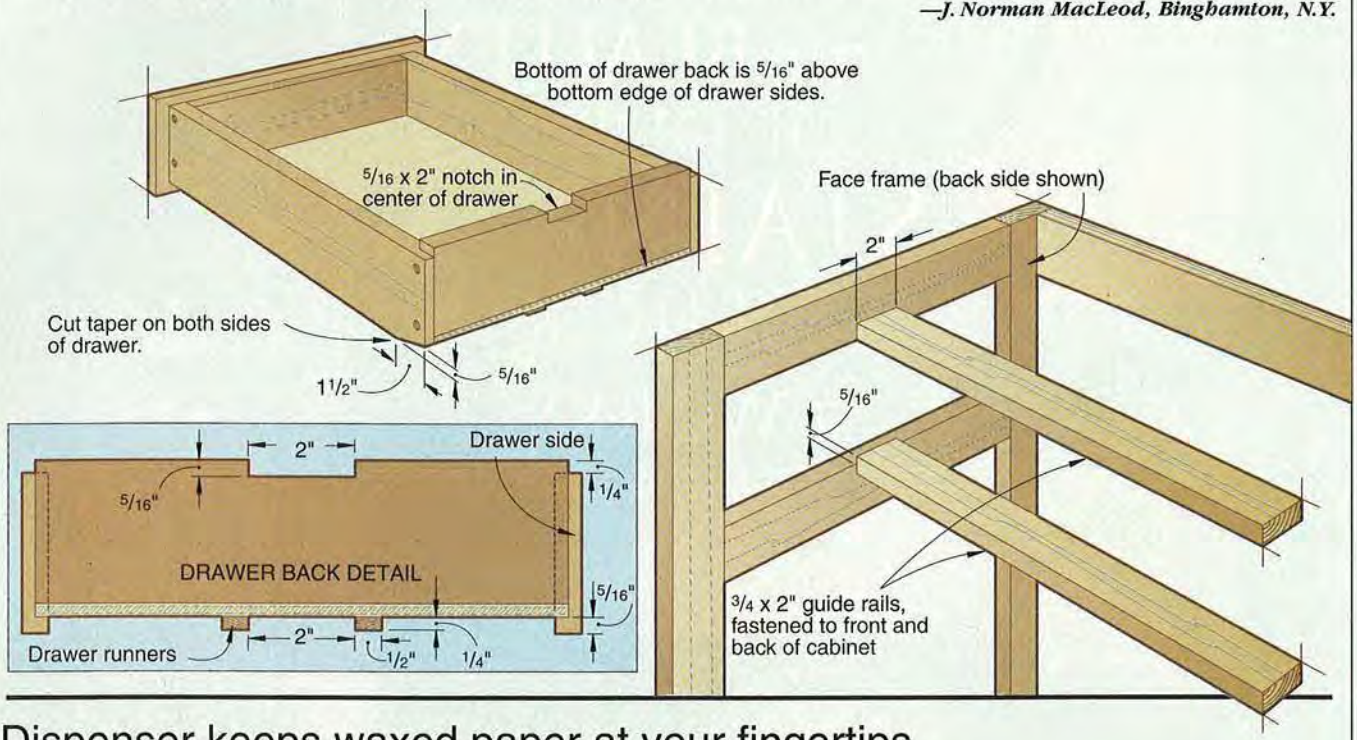
Continued from page 20

Save on drawer hardware with this simple slide

Look in the cabinet hardware section of any woodworking supply catalog, and you'll find a myriad of drawer slides. As a cabinetmaker, my father designed a simple slide system for drawers that's effective and inexpensive.

As shown in the drawing *below,* two centered guide rails run from the face frame to the cabinet back. The drawer rides on the bottom guide, which is captured by a pair of runners attached to the drawer bottom. The runners end 1½" from the back of the drawer. The top guide prevents the drawer from tipping down as it opens. The drawer back, standing ¼" taller than the sides, keeps the drawer from falling out when fully open. However, when you want to remove it, taper cuts on the bottom-back edges of the drawer sides provide the clearance. For durability, use hardwoods for the drawer sides and guides, and periodically apply paraffin wax to all the wear points.

—J. Norman MacLeod, Binghamton, N.Y.

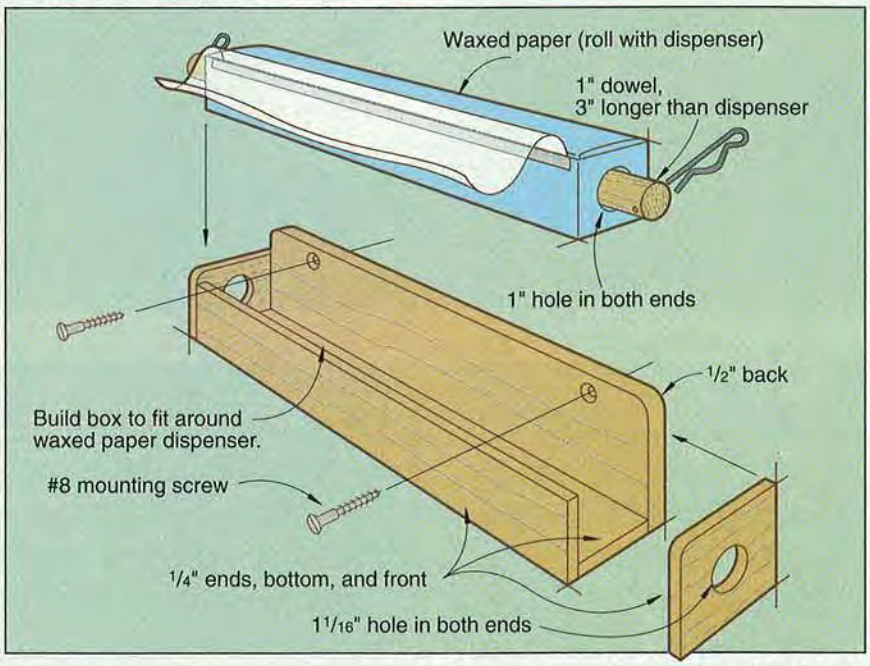


Dispenser keeps waxed paper at your fingertips

It seemed like whenever I needed waxed paper to protect my bench from glue squeeze-out, the waxed paper was buried in a drawer. I either had to dig it out with messy hands or stop and clean up before I went for it.

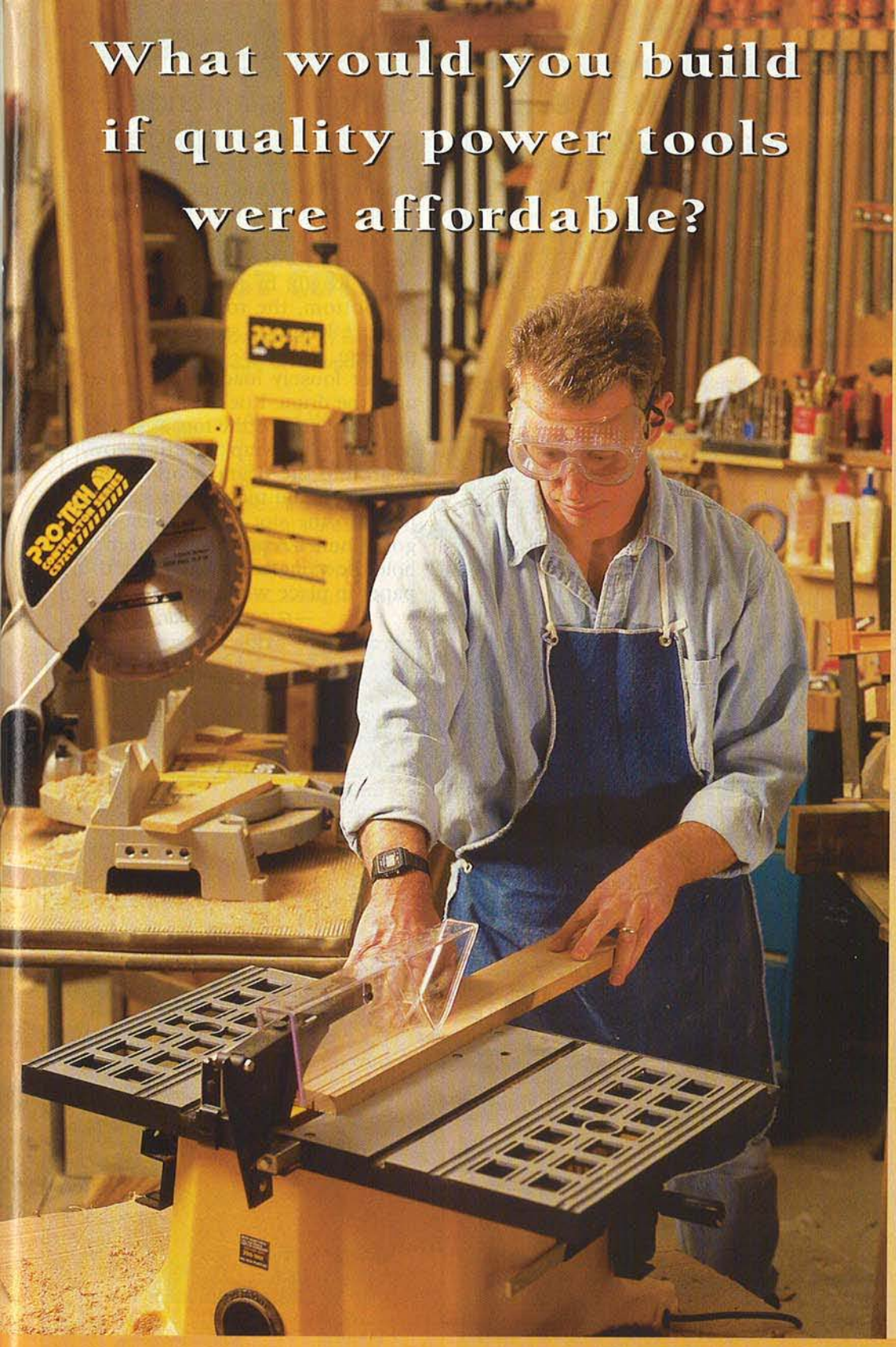
To put waxed paper within easy reach, I built a wooden box, just big enough to hold the waxed paper in its original box. To keep the roll from jumping out, I drilled a 1 1/16" hole in each end, cut matching holes in both ends of the waxed paper box, and slid a 1" dowel rod through the whole works. Then, in each end of the dowel, I drilled a hole and slipped a hairpin hinge pin through the hole to keep the dowel in place. With the box screwed to the wall, I never hunt for waxed paper.

—Martin Cecil, Owensboro, Ky.


Waxed paper (roll with dispenser)
1" dowel, 3" longer than dispenser
1" hole in both ends
1/2" back
Build box to fit around waxed paper dispenser.
#8 mounting screw
1/4" ends, bottom, and front
1 1/16" hole in both ends

Continued on page 24

What would you build if quality power tools were affordable?



What woodworking projects are you not tackling because you can't afford the right power tools? The answer is none at all if you're already using products from Pro-Tech's value line of affordable, high-quality power tools.

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TIPS FROM YOUR SHOP (AND OURS)

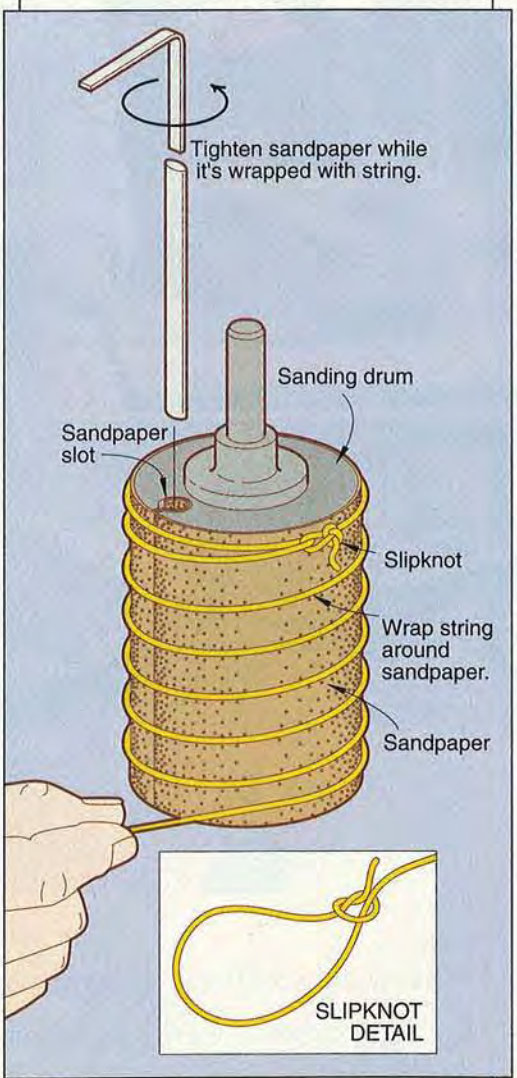
Continued from page 22

String puts an end to sandpaper slippage

Loading fresh sandpaper onto my sanding drum (the type that takes sandpaper sheets) used to make me crazy. I couldn't keep the paper tight against the drum along its whole length; by the time I got to the bottom, the top had worked loose. A length of string solved my problem.

After loosely loading the paper onto the drum, I tie the string with a slipknot around the top, as shown *below.* Next, I wrap the string slowly around the drum, working my way down and tucking the sandpaper into the slot in the drum as I go. When I reach the bottom, I hold the string taut while I lock the paper in place with the key.

—G. J. Warmbrodt, St. Louis



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Circle No. 44

TIPS FROM YOUR SHOP (AND OURS)

Continued from page 24

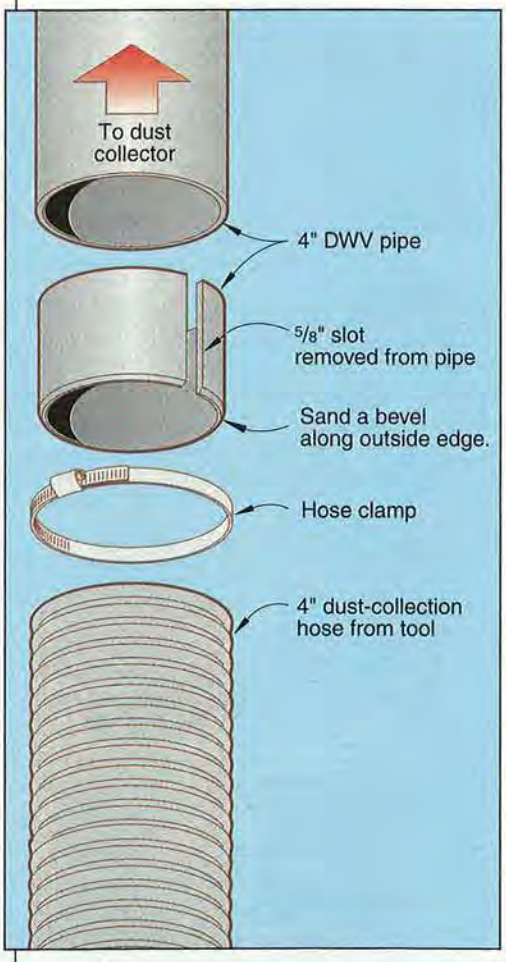
Nifty pipe coupler for 4" PVC dust collector

It's not uncommon to see 4" PVC drain-waste-vent (DWV) pipe used in a shop for dust collection—it's inexpensive and seals airtight. But, a normal DWV coupler makes a poor joint with the flexible 4" dust hose from your machinery.

To make my own coupler, I took a short scrap piece of DWV and cut a ⅝"-wide slot down the side, as shown *below*. I squeezed the piece—closing the slot—and slipped it into the dust-collection pipe, leaving just enough to attach the flexible hose on the other end.

When I released the piece, it flexed out and held fast inside the DWV. I slipped the flexible hose over my new coupler (sanding a bevel on the outside edge makes the job easier) and fastened it with a hose clamp for an airtight fit.

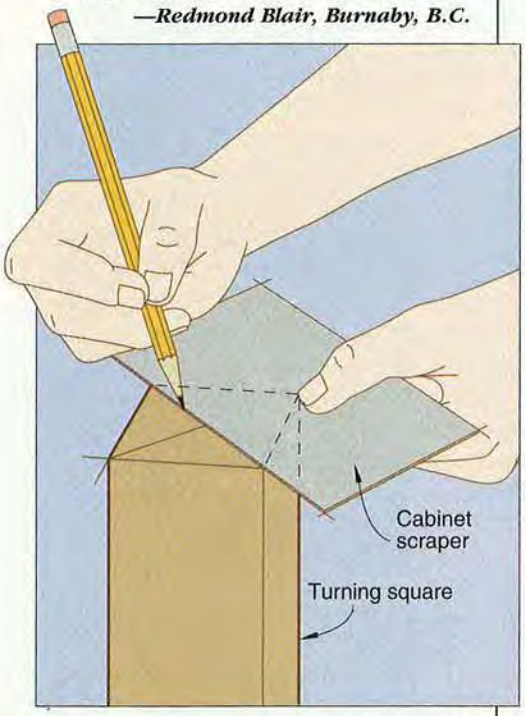
—Jim Downing, Design Editor, **WOOD®** ***magazine***


To dust collector
4" DWV pipe
5/8" slot removed from pipe
Sand a bevel along outside edge.
Hose clamp
4" dust-collection hose from tool

A gripping idea for drawing diagonals

When drawing diagonal lines on a small piece of wood, or lines on the end of a turning square, it's hard to hold the stock steady. I've found that a cabinet scraper works well. There's enough tooth on the side of the scraper to grip the wood and hold it until you draw the lines.

—Redmond Blair, Burnaby, B.C.



A FEW MORE TIPS FROM OUR WOODWORKING PROS

- Not happy with the results you're getting from your dado set? We uncovered many of the reasons a set may not be cutting up to par. See our review of premium dado sets beginning on *page 58*.
- Instead of boring and chiseling mortises, and sawing tenons for furniture joints, you can form them as you glue up parts. See how we used this technique in making the nightstand on *page 52*.
- You can "turn" simple round parts with abrasives and your drill press. See *pages 74-77* for details.

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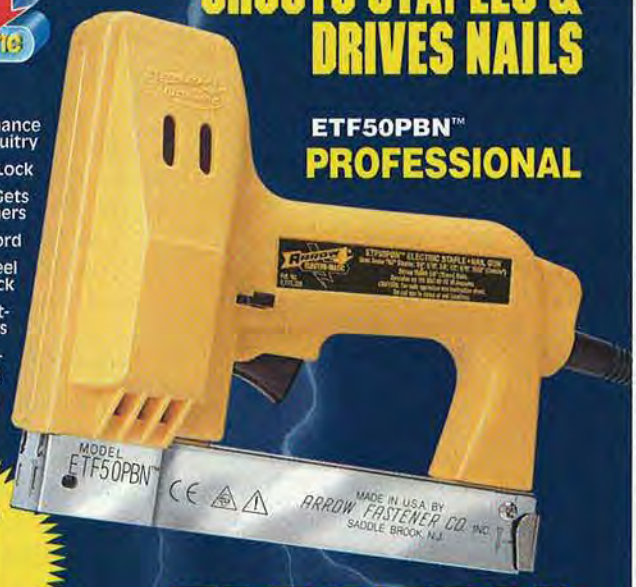

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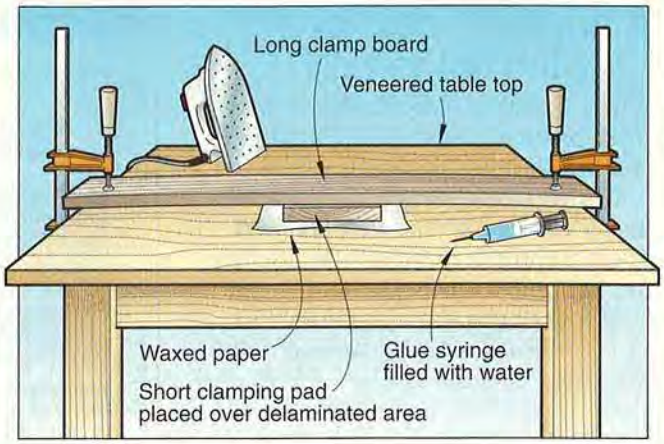
How to flatten bubbled veneer

I recently obtained an antique gaming table. The mahogany veneer that covers the top is in good shape, except for a bubble in one spot. Is there a way to repair this without replacing or refinishing the veneer?

—Charles R. Wanager, Decatur, Ill.


Long clamp board
Veneered table top
Waxed paper
Glue syringe filled with water
Short clamping pad placed over delaminated area

Most bubbles in veneer happen when heat and moisture penetrate the veneer and dissolve the old animal hide glue. Once the glue dissolves, the veneer swells and lifts, causing a bubble.

What you want to do, Chuck, is reactivate the glue (if there's enough under there) and then clamp the veneer flat. Sometimes, you can apply a moist towel with a hot iron to reactivate the glue, but if there's finish on the table, moisture probably won't be able to penetrate. In this case, you need to get the water under the surface. To do this, make a ⅛"- long cut at the base of the bubble with a razor blade. Now, use a glue syringe to squeeze a few drops of water into the bubble, and apply a hair dryer or hot iron over a protective cloth to heat up the old glue so it can mix with the new water. Be sure to check the surface often. Too much direct heat can blister the finish.

Once the glue softens, quickly press the bubble flat. Clamping in the middle of a table can be awkward. Try putting a short board directly on the bubble. Then, lay a long board over the top and clamp it to the ends of the table as shown *above*. After the glue has had time to cool and set, check to see if the bubble stays flat. If it doesn't, chances are there wasn't enough glue in there to begin with. Use your syringe again to insert new glue, and then clamp once more.

Estimating board feet on the stump

How do you calculate the number of board feet in a standing tree? Is there a formula or method used for this purpose?

—Hollis Gilbert, Herndon, Ky.

Circumference at breast height (inches)	Merchantable height (feet)					
	8	16	24	32	54	40
	Yield in board feet					
57	72	122	168	207	292	248
63	90	156	212	262	366	317
69	111	194	262	328	450	392
75	137	236	319	400	550	470
82	165	281	381	480	650	565
88	195	331	450	560	760	670
94	227	383	520	650	890	770
101	260	440	600	740	1,020	890
107	294	500	680	840	1,160	1,010
113	330	565	770	960	1,310	1,140

In the woods, Hollis, lumbermen use a scaling stick and some trigonometry to calculate the number of board feet in a tree. Without a scaling stick, you can come close by following this procedure and the chart at *right*.

First, estimate the usable height. Do this by marking your height on the trunk. Then, back off about fifty paces from the tree, and imagine how many times you can multiply your height up to the first defect, fork, or place where the trunk narrows to less than 10" in diameter.

Next, figure the trunk's circumference. To do this, measure the distance around the tree, at chest height, with a steel tape. Now that you know the height and circumference, simply use the chart *above* to find the board footage.

Have a question for our woodworking experts?

No matter how simple or perplexing your woodworking problem, we would love to hear from you. We'll do our level best to publish answers to the questions that interest the greatest number of our readers.

You can write to us at: Ask *WOOD*®, 1716 Locust Street, GA310, Des Moines, IA 50309-3023.

Or, have your questions answered by fellow woodworkers. Just join one of our internet discussion groups at: http://woodmagazine.com

Continued on page 30

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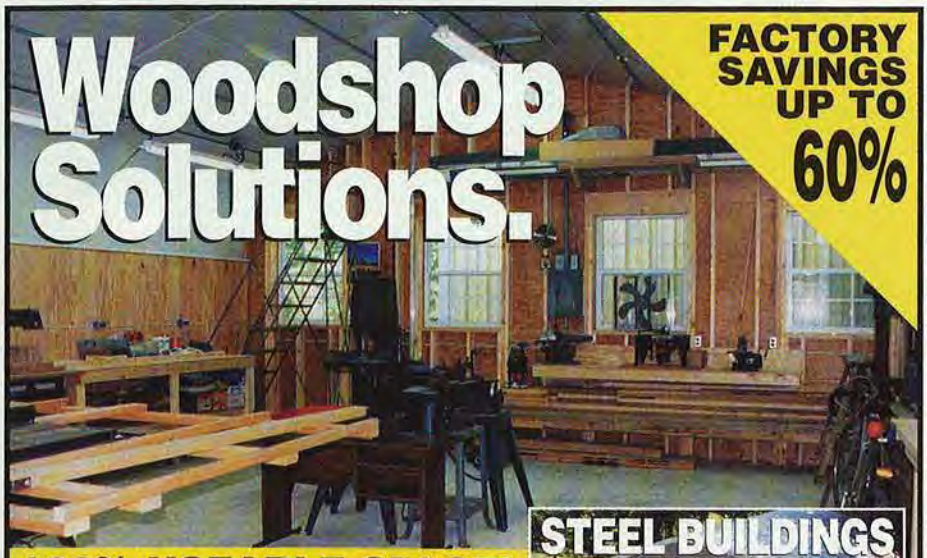

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Circle No. 2030

Continued from page 28

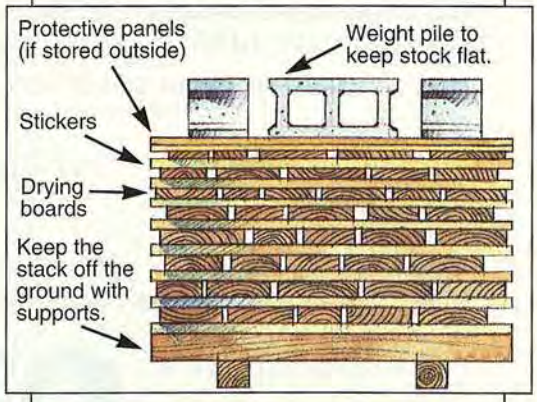
Keeping glue lines, in line

For many years I've had a persistent problem with gluing pieces of wood together. Even months after adhering, hard lines of glue emerge at many of the joints. It doesn't seem to matter what types of glue or finish I use in attempts to fix this problem, but I've noticed this doesn't happen when I build with exotic woods such as cocobolo and purple heart. I've had to refinish several projects because of the glue lines. Can you help?

—Kenneth Mussen, Glendora, Calif.

Ken, we suspect that the blame lies within the wood you're using. Most lumber is kiln-dried to about 8 percent moisture content. Then it's shipped all over the country. Places like Southern California have dryer air than the wood is acclimated to. So, you get this lumber, build something, and the wood continues to dry for several months. Finishes only slow the inevitable. As the wood dries, it shrinks. However, once glue sets up, it's stable— it doesn't shrink along with the wood. So, when the wood around the glue becomes smaller, the glue line sticks out. The exotic woods you mentioned are more stable because they're resinous and don't continually dry out.

The solution to your problem is to buy your wood well before you use it. Stack the boards as shown *below* with stickers (thin spacers) between them for about six months so they can get used to your dry desert air.

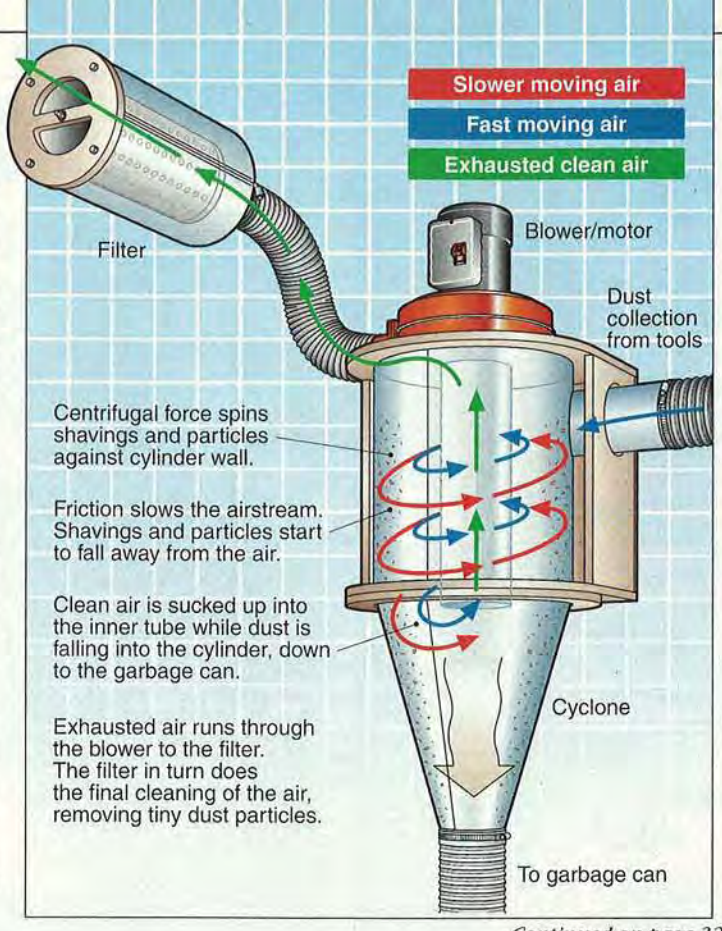

Protective panels (if stored outside)
Weight pile to keep stock flat.
Stickers
Drying boards
Keep the stack off the ground with supports.

How does a cyclone work?

I'm a beginning woodworker starting to set up my shop. Issue #100 of WOOD® *magazine just came in time as I have been thinking about which type of dust collector to buy. I'm intrigued by your cyclone dust collector (pages 54-61), but just don't understand how the dust in the cyclone falls into the trash can and doesn't get sucked up into the center tube. Can you explain this to me?*

—Nick Danke, St. Louis

Without getting into complex physics, Nick, here's the short answer. Due to the placement of the inlet pipe, the air and debris enter the cylinder in such a way that they swirl around the inside. Centrifugal force spins shavings and dust particles out against the side of the cyclone. There, friction slows the air. Since the ability of an airstream to suspend particles is dependent on speed, this slower layer of air lets the particles drop down into the trash can. The outlet is situated in the center of the cylinder, away from the sides where all the particles are, so it exhausts mostly clean air.


Slower moving air
Fast moving air
Exhausted clean air
Filter
Blower/motor
Dust collection from tools
Centrifugal force spins shavings and particles against cylinder wall.
Friction slows the airstream. Shavings and particles start to fall away from the air.
Clean air is sucked up into the inner tube while dust is falling into the cylinder, down to the garbage can.
Exhausted air runs through the blower to the filter. The filter in turn does the final cleaning of the air, removing tiny dust particles.
Cyclone
To garbage can

Continued on page 32

TOOL TALES *No.* 3

[REAL STORIES OF *LEATHERMAN® TOOLS* AND THE PEOPLE WHO USE THEM.]

THE TRUCK DIED ON the RHINO TRAIL. AAA was PROBABLY out of The QUESTION.

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SN60 **Full Round Head Nailer** $388.90
PC0701 **A9 Palm Nailer**...$159.00

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ASK WOOD

Continued from page 31

You, too, can rid your saw of rust

I've recently inherited a Montgomery Ward Power Kraft tablesaw from my grandfather. It runs great, but the table is covered with rust. Is there anything I can do to remove the rust? If so, how can I prevent the table from rusting again?

—Charles Walker, Delano, Calif.

Charles, we'll venture out on a limb here and say that you're not alone in your rusty dilemma. A tablesaw has many bare metal surfaces that see moisture, scratching, and hard use. Rust thrives in that environment.

Since they're made of the same material, we'd attack that rusty tablesaw the same way a body man would rid a car of rust. Spread some paste auto-body rubbing compound around on the rusted surface with a rag. Don't be afraid to use a little elbow grease. As long as the rust is only on the surface, and hasn't begun eating through the metal yet, it'll begin to disappear. You may have to attack the metal with sandpaper or a grinder if more advanced rusting exists.

Use mineral spirits to wash the residue away. What's left is a fresh metal surface that's immediately vulnerable to new oxidation and rust. So, protect the table before rust gets a new foothold. Use several coats of ordinary paste car wax on bare metal surfaces. With wear, the wax's protection will fade away, so re-apply a fresh coat every couple of months.

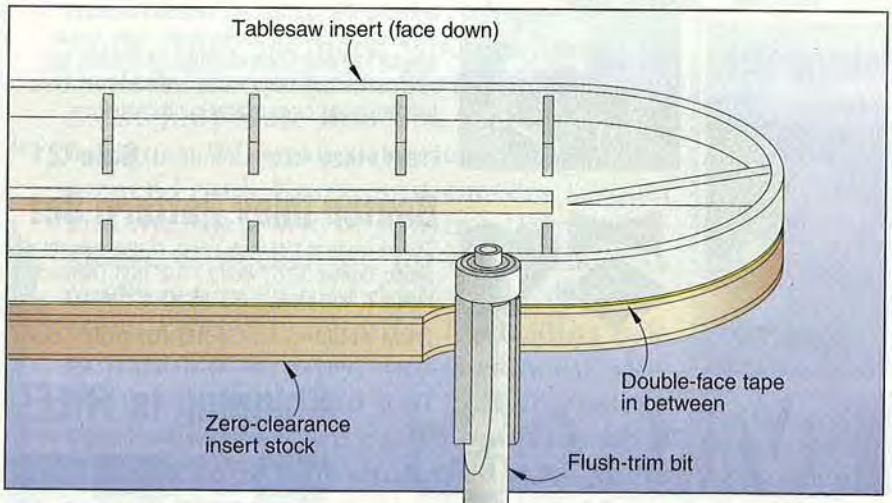
How to make a zero-clearance insert

While testing the premium dado sets reviewed on *pages 58-63*, we discovered that some sets will make clean, chip-free, cross-grain cuts in veneered materials only if you use them with a zero-clearance insert in your tablesaw. (You'll need a separate insert for each width of dado cut you make.)

You may be wondering how this handy gadget gets its name. Because you raise the running dado set through the insert to make its opening as shown at *right*, there's zero clearance between the sides of the set's outside teeth and the insert. The surface of the insert completely supports the veneer of the workpiece and prevents it from chipping as the teeth exit the cut.

To make one, use your saw's metal insert as a template. With double-face tape adhere the metal insert to a piece of plywood, hardboard, or any other stable material. Use either ¼" or ½" material—whichever is just slightly thinner than your metal insert. Saw just outside the plate and trim the wood insert to the exact shape of the metal insert with a flush-trim bit in your router table (see illustration *below*). Set the zero-clearance insert flush with your tablesaw top by applying small strips of tape to the underside of the insert where the tablesaw supports it. Hold the insert down with your tablesaw's fence and raise the running dado set through it.

Hold the zero-clearance insert down with your tablesaw fence as you cut through the insert (but not your fence!).



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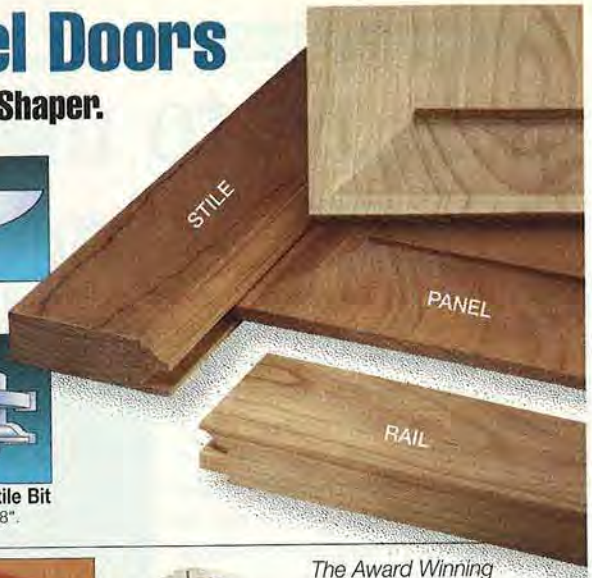

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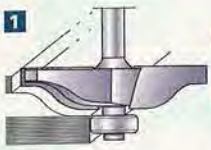

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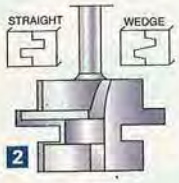

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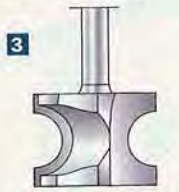

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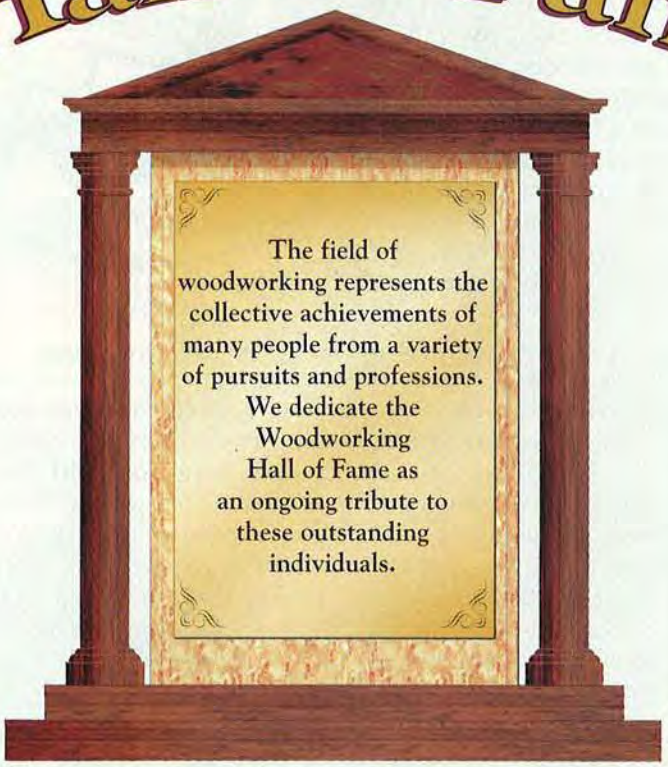
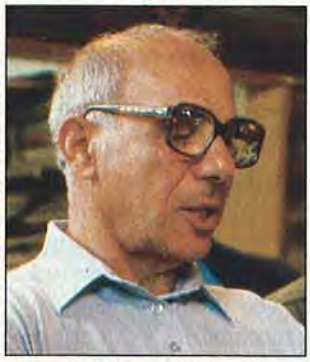


Presenting the 1998 Inductees

In the November 1997 issue of *WOOD*® magazine we introduced the 10 inaugural members in our Woodworking Hall of Fame. They included woodturner Rude Osolnik, marquetarian Silas Kopf, intarsia artist Judy Gale Roberts, woodworking designer Wharton Esherick, ornamental turner Frank Knox, and carvers Lemuel and Stephen Ward. Joining them were Alonzo G. Decker, Jr., for achievement in modern power tool design and development, Gifford Pinchot for his leading role in national forestry, and Gustav Stickley for furniture design and craftsmanship. The inductees were each honored with a decorative plaque engraved with their contribution to the field of woodworking.

Samuel S. Maloof (1916-): For design and craftsmanship in furnituremaking



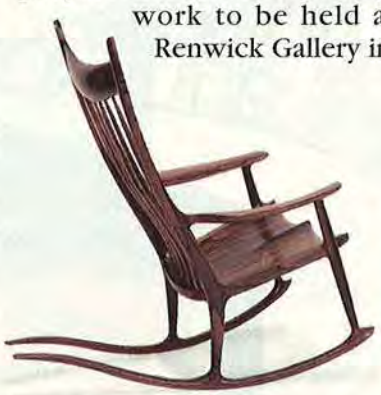
Without formal training, Sam Maloof began his woodworking building furniture for his parents in 1934. But his work was that of a graphic artist until 1948, when he received his first furniture commission. From that time on, the California craftsman has made his living by building furniture that some say has the spirit of Danish design. Maloof, though, believes that he simply creates furniture that people can be comfortable living with. He says, "If you're not preoccupied with

Print this article

making an impact with your designs, something that looks good today will look good tomorrow."

Maloof's pieces reflect this: symmetry, joints integrated with the lines, and oil finishes. His 1983 book, *Sam Maloof, Woodworker*, told of his work and philosophy. His furniture resides in the collections of the Smithsonian's Renwick Gallery, New York's Metropolitan Museum of Art, the Boston Museum of Fine Arts, the Los Angeles County Museum of Art, and others. Sam Maloof was the first woodworker elected a Fellow of the American Crafts Council. In 1987 he was honored with a MacArthur Foundation "Genius" grant. The Rhode Island School of Design awarded him an honorary doctorate in 1995.

Maloof still works 10 hours a day in his Alta Loma, California, studio and teaches a few seminars a year. He says, "Each day is a renewal of my life. How good it is to be able to work at something that is so satisfying." Presently, Sam Maloof prepares for the first retrospective exhibit of his work to be held at the Smithsonian's Renwick Gallery in the year 2,000.



Norm Abram (1950-): For popularizing the woodworking craft

Learning much of his craft from his father, Norm Abram, of Milford, Massachusetts, was a building contractor when he left the trade in 1979 to appear with host Bob Vila on the Public Television series *This Old House*. With Bob Vila's departure and Steve Thomas' arrival in the late 1980s, Abram was in place for his own show. *The New Yankee Workshop* was launched in 1988 by Boston's channel WGBH and now plays to nearly 300 stations and four million viewers each week.

With a friendly presentation, Norm Abram brings to his audience projects that he has adapted from popular styles in the United States and Europe. His straightforward approach that emphasizes power tools and new gadgetry takes much mystery away from the craft. Over 10 years, he has taught how to build 124 classic projects that adhere to his tenets: "Integrity of craftsmanship, and a practical, artistic value." His name has become synonymous with woodworking, and he continues to be a beacon for those wishing to join the movement toward wood.

How we choose our candidates

To be considered for induction into the Woodworking Hall of Fame, candidates must:

- Have made (need not be living) or be making a significant impact in the North American woodworking field through one (or more) of the following areas—design, craftsmanship, education, research, product development, and public service on a regional or national level.
- Have made or be making their contribution(s) in the 20th century.

A selection committee made up of *WOOD*® magazine staff members annually gathers the nominees received from our staff and readers and votes in the year's inductees. Names are announced in the October issue. To submit a candidate for nomination, send a short biography of the person along with a statement indicating his or her accomplishments to *WOOD* Magazine's Woodworking Hall of Fame, 1716 Locust St., GA310, Des Moines, IA 50309-3023.

Photographs: Courtesy of Samuel S. Maloof, Anderson Ranch; WGBH-TV Boston

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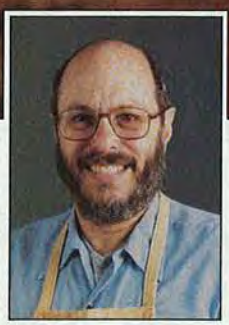

"You can't glue air. You have to build up the wood for a tight, surface-to-surface fit."

Bob Flexner

Old furniture's initial glue-up lasts only so long. Joints eventually give in to wood movement, hard use, and time, and you will have to reglue. To show you how a pro gets ailing furniture back on its feet, we dropped in on antique restorer and finishing expert Bob Flexner.

In his Norman, Oklahoma, shop, Bob Flexner has enjoyed restoring old furniture for more than 20 years because of the challenges involved in solving problems. And he gets really frustrated when he sees bad furniture repairs that only complicate already existing problems. "Bad repairs only serve to destroy a piece of furniture," he exclaims. "And there's only so much of this fine furniture from the past around. If it's poorly repaired, it's only a matter of time before the repairs break down. Then the furniture follows, and ends up in the landfill."

Bob divides furniture repair into two aspects: making parts and gluing. "But all of a craftsman's numerous woodworking skills come together in the gluing," he strongly believes. "If you can't glue the

Continued

Print this article

"White glue [or yellow glue] won't bond to hide glue—the joints first must be thoroughly cleaned."

To protect the wood when knocking an old chair's joints loose, Bob Flexner relies on a dead-blow hammer and a cushioned tabletop. Solid hits make the job go quickly.

piece to make it structurally strong, it won't last, no matter how well you're able to reproduce parts. To me, there are two parameters to remember for repairing with white and yellow glues: clean wood, and tight, wood-to-wood contact."

To demonstrate the right way to reglue, Bob salvaged a pair of turn-of-the-century oak straight-backed chairs from a local used furniture shop. "They're wobbly because the joints have failed over time," he notes. "You can expect the same from any type of furniture in which traditional woodworking glues—hide glue, white glue, or yellow glue—have been used. Yet, if you heed the following steps, your repairs will keep that furniture around another 100 years."

How to put the hits on old furniture

Because white and yellow woodworker's glues weren't developed until World War II, furniture made prior to that date was built with hide glue and comes apart rather easily, according to Bob. For that task, his favorite tool is a shot-filled dead-blow hammer, since it doesn't mar the wood.

For knocking apart joints, Bob sets up the chair on a large table covered with a cushiony blanket—again to protect the wood, as shown *left*. It's as the disassembly begins that he often encounters poor repairs, such as nails driven into the joints, or metal brackets and other hardware. "Bad repairs like that often cause the wood to split," he points out.

"It's essential that you inspect the piece you're working on for metal, then remove it before you attempt a repair," he says. On this day, he finds no nails or other metal in the chair he's dismembering. However, had he discovered nails, for instance, Bob would gently work them out of the joint with electrician's sidecutters, doing as little damage to the wood as possible.

"Joints fail because of the natural shrinking and swelling of the wood during seasonal changes," he notes,

tapping a leg to loosen it from the stringer. "This puts stress on the glue and eventually causes it to break down." For the most part, the joints come easily apart with a few blows.

As he frees each piece of the chair, Bob places it in position on the blanketed table. "Keep the pieces in some sort of order so that you'll be able to put them back together right," he emphasizes. Continuing, he deftly works his way through the chair's subassemblies until he meets resistance.

"Because this chair was made with hide glue, I can simply undo this tough joint by injecting a little denatured alcohol into the joint with a syringe," he notes. "In a few seconds, the alcohol crystallizes the glue and I can break the bond. If the alcohol leaves a white mark on the finish, just remove it with fine steel wool dampened in linseed oil.

"If you come across white or yellow glue in the joints, you can still get them apart by injecting vinegar or warm water," Bob advises. "It takes minutes longer, but you'll be able to get them apart. Epoxied and superglued joints are another story—they're almost impossible to reverse—a reason you shouldn't use them in the first place. Acetone or lacquer thinner may work, but you're likely to damage the finish."

For a good bond, Bob uses a cabinet scraper to take off the aged hide glue from a square tenon.

Left: Regluing a chair with white or yellow glue requires cleaning out all the old glue from a mortise joint like this.

With a kitchen brush, the restorer works water into mortises and dowel holes to dissolve remaining hide glue.

Clean wood bonds to clean wood only

The chair apart, Bob focuses on cleaning the joints, as in the photos *right*. This craftsman has racked up years of experience with hot hide glues. And because even old hide glue can be reactivated to bond with fresh-mixed, hot hide glue, that's his adhesive of choice for professional repairs (and to preserve antique value).

"To most of today's woodworkers, though, mixing, heating, and applying it isn't familiar. So I'll use

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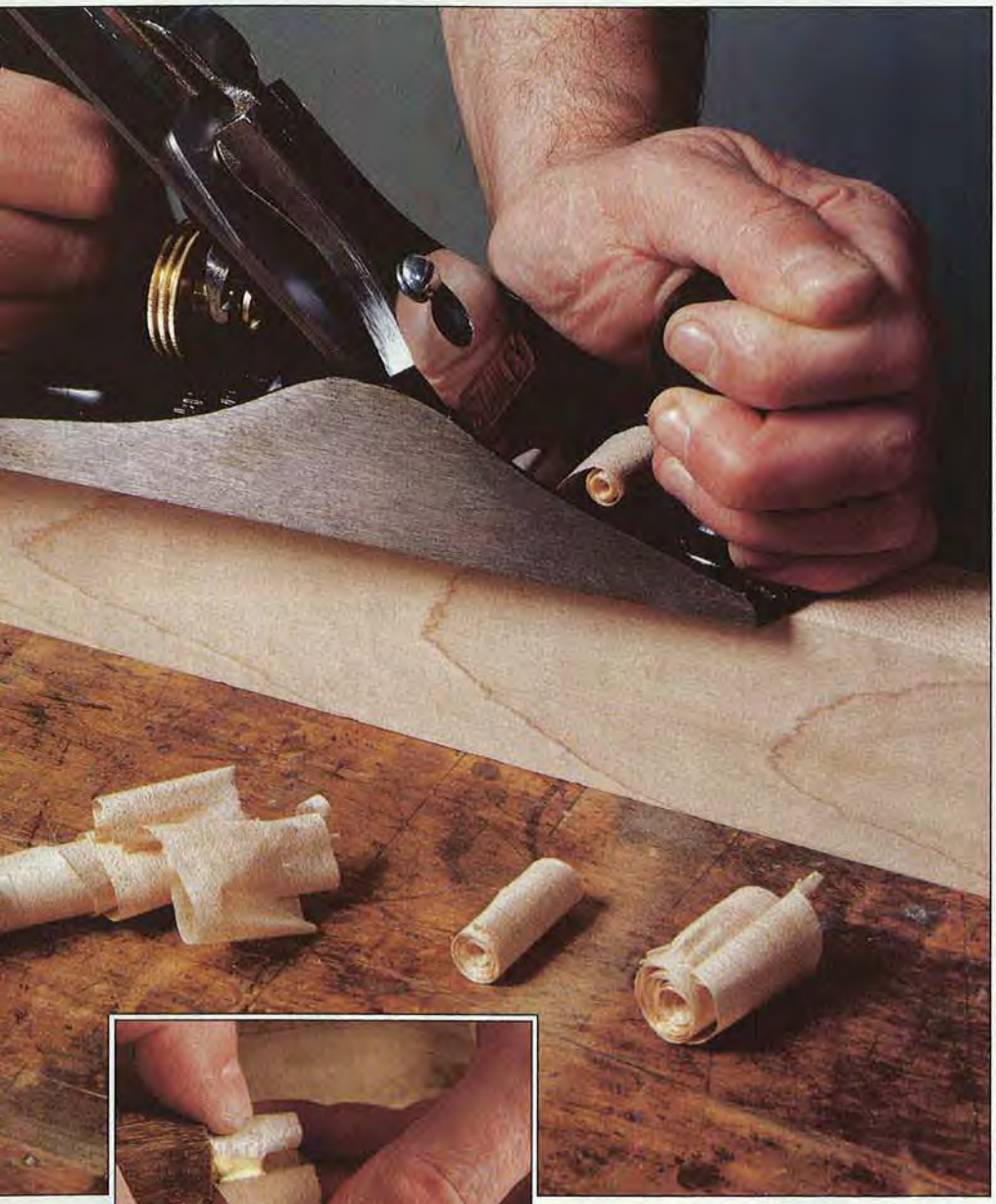
"I use my hand plane to take off a thin shaving...then wrap the curl around the tenon, tearing off what I don't need for thickness."



With a hand plane going with the grain, Bob shaves a tight curl of hard maple that he'll use to build up a worn round tenon.

Using yellow glue because of its greater tackiness, he attaches the curl of maple to the tenon, then rolls it to spread glue. Its shape holds it in place without a clamp.

white glue in this chair because of its longer open time," he says. "But because white glue [or yellow glue] won't bond to hide glue, the joints first must be thoroughly cleaned."

The cleanup becomes nearly effortless. First, the restorer scrapes away any old glue buildup on joint surfaces with a knife or cabinet scraper. Then, with a cloth dampened in warm water, he wipes the tenons and mortises. "When the surfaces become sticky, you'll know the glue is dissolving," Bob says. "For mortises and dowel holes, it helps to use a small kitchen brush or metal pan scrubber that fits into the hole to work the surfaces. When the glue is dissolved, you can feel the clean wood with your finger. Remember, though, that when the wood is finally clean, allow it to completely dry before beginning the regluing."

What to do when joints need restructuring

A not-uncommon problem Bob finds is worn joints, either from use, improper machining in the first place, or as the result of the cleaning operation. "Because you can't glue air, you have to build up the wood for a tight, surface-to-surface fit," he cautions.

To build up a square tenon, for example, Bob cuts a slightly oversize piece of veneer of appropriate species and thickness from sheet stock on hand. He makes sure that the veneer matches the grain direction of the tenon, then glues it in place. For an even bond, Bob clamps a small, flat piece of wood —with a barrier of waxed paper under it—to the tenon. A spring clamp holds the piece until the glue dries.

"Depending on how bad it's worn, I sometimes have to add a piece on both sides of the tenon," says Bob. "And I might have to build up the narrow top and bottom, too." After the built-up tenon has dried, he trims away any excess with a craft knife or sharp chisel.

You can build up round tenons, too, but with a little different

method. "With those, I clamp a maple board onto my workbench and use my hand plane to take off a thin shaving [as shown *opposite*]. I use maple because it holds together—the shaving won't split," he explains. "Next, I apply glue to the tenon—this time yellow glue because it gets tacky faster— then wrap the curl around the tenon, tearing off what I don't need for thickness. A little twist with my fingers spreads the glue. Its natural curl will keep it in place without using a clamp."

Bob has learned that even a little dried glue from his fingers may prevent a later bond. So he sands the built-up tenon after the curl has dried with 220-grit paper.

To rebuild a chair, reglue section to section

Ready to reglue, Bob gathers his materials: white glue, a small brush, pipe clamps with padded ends, and a damp cloth. The chair parts he so carefully arranged in the order of disassembly get more scrutiny. "To simplify the regluing, you should glue up one section of chair, then glue up another, and finally glue the sections together," Bob advises.

"To be sure everything aligns, you might want to dry-fit the pieces before you glue, especially noting the length of any dowels you've installed [See the companion article, "Dealing with Dowels", on *page 110*]. Then, sand down any oversize dowels or build up small ones like tenons."

Spreading glue from a wide-necked container with a brush instead of straight from the bottle goes faster and produces a more even coat, according to Bob. And he works swiftly doing that. First come the mortises or dowel holes ("You gain open time doing them first"). He's careful to coat just the sides and not fill the holes ("The tenons or dowels will spread the glue evenly"). After clamping, he wipes off any excess glue.

Bob can get by with only two pipe clamps. The reason? "The joints should be so tight-fitting that once I've pulled them together, they'll stay, and I can remove the clamps to clamp up another section." He avoids juggling little pieces of scrapwood for pads and instead uses plastic pads fastened directly to the clamps.

The curved backs of some chairs require a shop-made jig of scrap plywood to achieve parallel clamping when pulling the joints together in reassembly.

"After I've pulled all the joints together with the clamps, I remove the clamps and check to see how the chair stands on my table," he says. "If it rocks a little, it means one of the legs is off. I can remedy that by reclamping that side at a slight angle to draw a leg up or down. At first, it takes some experimentation, but when you use white glue, you have plenty of time to spare for adjustment."

For a chair with parallel lines, the clamping goes easy. But for a chair with nonparallel lines, like an Empire-style chair with its curved back, some problem-solving again enters the picture.

"I make clamping jigs from scrap plywood. One edge I saw out to profile the chair's curve, the other I leave straight [see photo *above*]," says Bob in describing his solution. "That gives me parallel clamping surfaces. And I've got quite a collection of them because few chairs are ever alike."

Ready to learn more about furniture repair?

You can order Bob's 90-minute video *Repairing Furniture with Bob Flexner* by sending a check or money order for $19.95 (U.S. ppd.) to Bob Flexner, P.O. Box 214, Norman, OK 73070. It covers veneer repair and patching, fixing breaks, matching parts, and more.

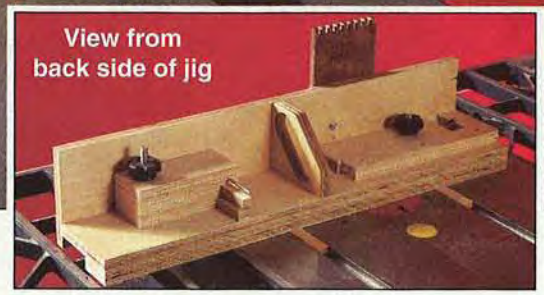
Written by Peter J. Stephano Photographs: Bob Hawks Graphic design: Perry McFarlin

Box-Joint Jig

A WOOD MAGAZINE EXCLUSIVE

I've always liked box joints, and here's why. They offer both strength and unique good looks. Although not as refined as dovetail joints, they can be cut on a tablesaw or router table using a simple shop-built jig. Not only that, but I can use a box-joint jig on virtually any width or thickness of stock. Our jig combines simplicity of construction with micro-adjustability. Interchangeable indexing pins allow you to cut box joints of any size without having to build a different jig each time.

Jan Hale Svec
Assistant Design Editor



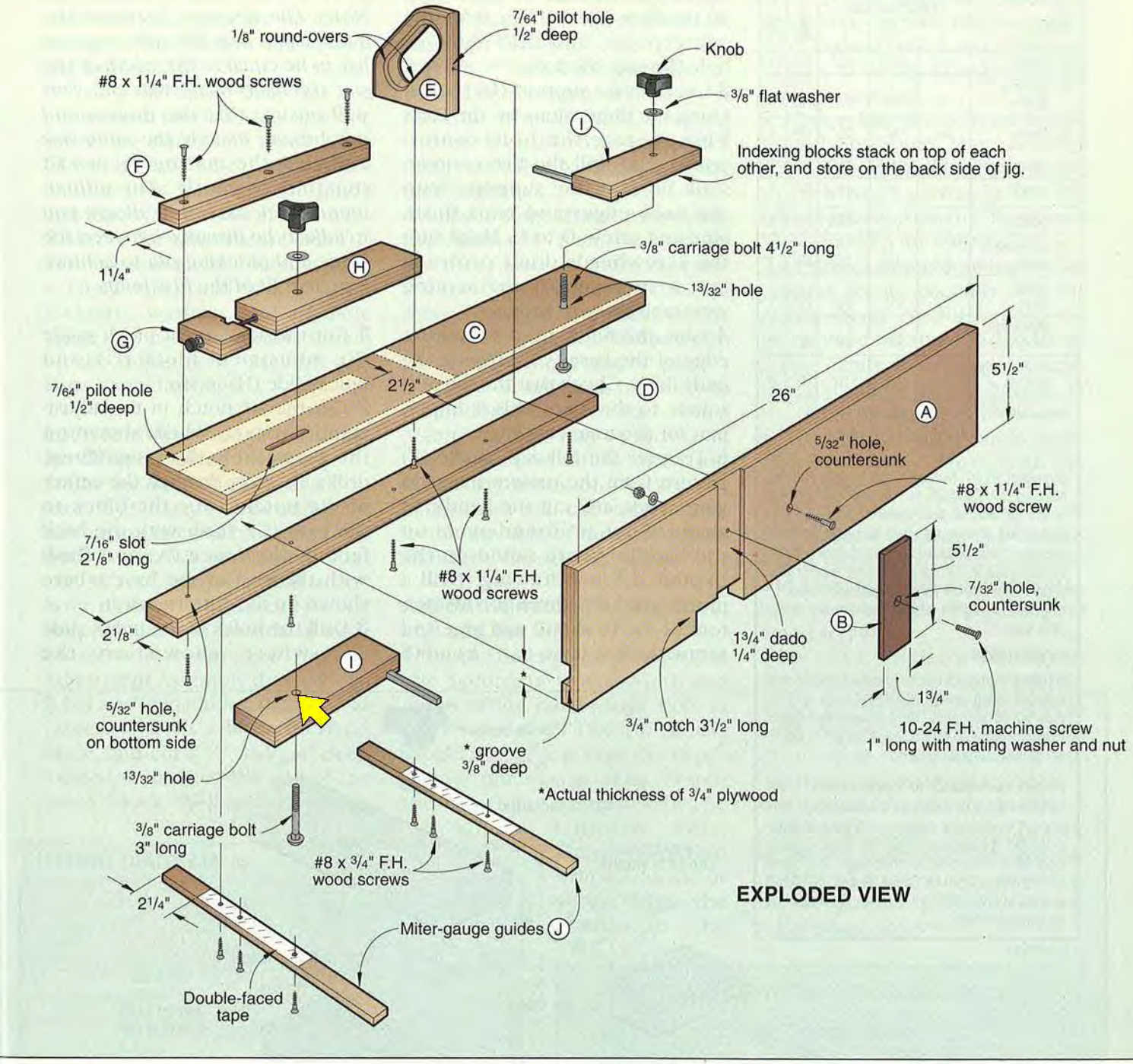
Let's start with the fence assembly

1 Cut the jig fence (A) to the size listed in the Bill of Materials and shown on the Parts View drawing on the top of *page 48*. (Due to its stability, strength, and lack of voids we used ¾" [18mm actual] Baltic birch plywood.)

2 Mark the location, and cut the ¾×3½" notch along the bottom of the fence (A) where dimensioned on the Parts View drawing. Then, mark the location, and cut the 1¾" dado ¼" deep in the front face of the fence.

3 Measure the exact thickness of your plywood, and cut a groove along the back side of the fence (A) where shown on the Parts View and Exploded View drawings. The groove should be as wide as your plywood is thick. And, the groove should be up from the bottom edge of your ply-

With a penchant for precision



wood a distance equal to the thickness of your plywood.

4 Mark the centerpoint, and drill and countersink a 5/32" hole through the fence for attaching the handle (E) later. Mark light lines on the back side of the fence for positioning the handle onto the fence later.

5 Cut the backing plate (B) to size. The backing plate is used to minimize chipout when using the jig. You'll need one backing plate for each size of finger joint you'll be cutting. The plate should fit snug, yet slide in the 1¾" dado in the front face of the fence. Drill a 7/32" mounting hole through the backing plate and into the fence. Screw the plate to the fence.

Add the base assembly for stability

1 Cut the plywood jig base (C) to the size listed in the Bill of Materials and dimensioned on the Parts View drawing.

Continued

Box-Joint Jig

Bill of Materials					
Part	Finished Size			Matl.	Qty.
	T	W	L		
A fence	¾"	5½"	26"	BP	1
B backing plates	¼"	1¾"	5½"	HB	4
C base	¾"	5"	26"	BP	1
D support	¾"	2⅛"	26"	BP	1
E handle	¾"	4"	4⅝"	BP	1
F guide	¾"	1¼"	10½"	BP	1
G adjustment block	¾"	2½"	1½"	BP	1
H index slide	¾"	2½"	8¼"	BP	1
I indexing blocks	¾"	2½"	5¾"	BP	4
J miter-gauge guides	⅜"	¾"	10"	B	2

Materials Key: BP–birch plywood, HB–hardboard, B–birch

Supplies: #8×¾" flathead wood screws, #8×1¼" flathead wood screws, ⅜" carriage bolt 3" long with a flat washer and plastic knob; 10-32 all-thread rod 4" long with two locknuts, two flat washers, 10-32 threaded insert, and mating knob; ⅜" carriage bolt 4½" long with a flat washer and plastic knob; 10-24 flathead machine screw 1" long with mating flat washer and nut; key stock; clear finish.

BUYING GUIDE

Hardware kit. All the hardware listed in the Supplies listing *above*. WOOD KIT BJJ1, $17.95 plus $3.95 shipping. Schlabaugh and Sons Woodworking, 720 14th Street, Kalona, IA 52247 or call 800/346-9663 to order.

Easy-to-assemble kit. All the pieces listed in the hardware kit *above*, plus all the Baltic birch plywood and solid-birch pieces cut to the size listed in the Bill of Materials. WOOD KIT BJJ2, $79.95, plus $8.50 shipping. Schlabaugh and Sons Woodworking, 720 14th Street, Kalona, IA 52247 or call 800/346-9663 to order. Or e-mail at schsons@kctc.net

2 Mark the location and cut the 7/16" slot in the base where shown on the Parts View. Then, mark the centerpoint, and drill the 13/32" hole through the base.

3 Cut the base support (D) to size. Using the dimensions on the Parts View, locate the hole centerpoints, and drill the five countersunk holes in the support. With the back edges and ends flush, glue and screw D to C. Make sure the screwheads don't protrude below the support and scratch your tablesaw top later.

4 Glue the fence (A) to the front edge of the base (C), keeping the ends flush. Check that the fence is square to the base. This is important for accurate cuts later.

5 Transfer the full-size handle (E) pattern from the pattern insert to your stock, and cut the handle to shape. Rout ⅛" round-overs on the handle where noted on the Exploded View drawing. Drill a mounting hole through the bottom of the base (C), and glue and screw the handle to parts A and C.

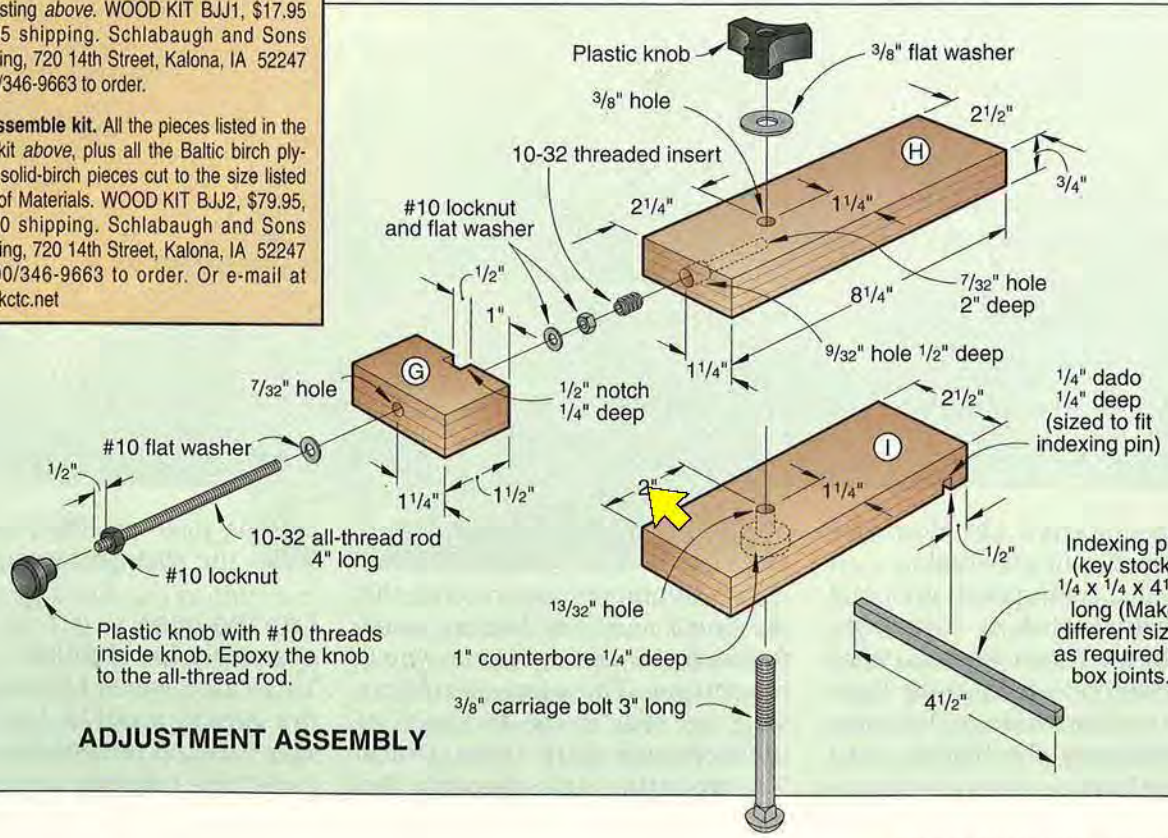
For perfectly placed fingers, add the adjustment block

Note: The distance between the dado blade and the indexing pin has to be equal to the width of the slot the dado blade will cut. This will ensure that the fingers and notches are exactly the same size and that the mating pieces fit together correctly. The adjustment block assembly allows you to adjust the distance between the blade and indexing pin to achieve a perfect fit of the box joints.

1 Cut the adjustment block guide (F), adjustment block (G), and index slide (H) to size.

2 Cut the ½" notch in the adjustment block (G) where shown on the Parts View drawing. Then, drill a 7/32" hole through the center of the notch. Glue the block to the base (C), flush with the back face of the fence (A) and flush with the end of the base where shown on the pattern insert.

3 Drill the holes in the index slide (H) where shown on the



ADJUSTMENT ASSEMBLY

Adjustment Assembly drawing and pattern insert. Drive a 10-32 threaded insert into the 9/32" counterbore, centered in the end of the index slide.

4 Using the index slide (H) and adjustment block (G) as spacers, screw the adjustment block guide (F) in place. The index slide should slide between the guide and fence (A) without slop.

5 Secure the adjustment block (G) and index slide (H) together with a 10-32 all-thread rod 4" long, locknuts, washers, and a plastic knob in the configuration shown on the Adjustment Assembly and Parts View drawings.

Let's form the indexing blocks for different sized fingers

1 Cut the indexing blocks (I) to size. Cut extras depending on how many sizes of box joints you wish to cut. We recommend four (⅛", ¼", ½", and ¾"). Drill a 13/32" hole with a 1" counterbore ¼" deep on the bottom side of each block where located on the Adjustment Assembly drawing.

2 For a ¼"-wide index pin, fit your tablesaw with a ¼"-wide dado blade, and cut a ¼" dado ¼" deep located ½" in from the end of the index block. Be careful to keep the dado perpendicular to the front edge of the indexing block. where shown on the Adjustment Assembly drawing.

3 From ¼" key stock, crosscut an index bar 4½" long, and epoxy it into the ¼"-wide dado, keeping the back end of the key stock flush with the back edge of the indexing block.

4 Repeat steps 2 and 3, keeping the dadoes ½" from the end for the other sizes of indexing pins. We used metal key stock (used to secure pulleys to spindles) for the ⅛" and ¼" pins and Baltic birch plywood for the ½" and ¾" pins.

5 Secure an indexing block (I) to the bottom side of the base with a 3"-long carriage bolt as shown on the Exploded View drawing. When the index blocks are not being used, you can secure them to the top side of the base where shown on the same drawing.

Attach the miter-gauge guides, and add the finish

1 Cut the miter-gauge guides (J) to size according to the width and depth of the miter-gauge slots in your tablesaw. The thickness should be 1/16" less than the depth of your miter-gauge slots. Test-fit the miter-gauge guides in the tablesaw slots. Then, using thin strips of plastic or wood, shim the guides in the miter-gauge slots so the top surface of each guide protrudes just above the surface of your tablesaw. Doing this keeps the bottom surface of the jig from rubbing on the tablesaw top.

2 Mark a line on each guide 2¼" from the back end. Then, adhere a 5"-long piece of double-faced tape to each guide starting at the line just marked. See the Exploded View drawing for reference.

3 As shown in the drawing *below*, position the jig assembly onto the guides, being careful to keep the jig square to the blade. Press down firmly to adhere the tape-covered guides to the bottom of the jig assembly.

4 Turn the base assembly over, and drill and countersink six mounting holes through the guides and into the bottom of the jig base (C). Leaving the double-faced tape between the guides and base, screw the guides to the base bottom with #8×¾" flathead wood screws.

5 Remove the hardware, then finish-sand all the wood pieces. Apply a clear finish to the parts to seal the parts and keep them clean over time. Reattach the hardware and reassemble the jig.

6 If you used solid stock for the miter-gauge guides (J), apply a bit of paraffin to the sides and bottom of the two guides for easier sliding of the guides in the tablesaw miter-gauge grooves.

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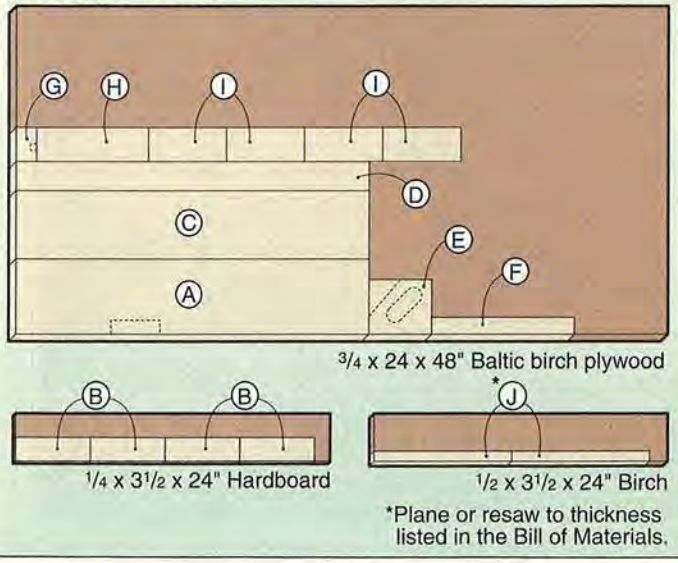
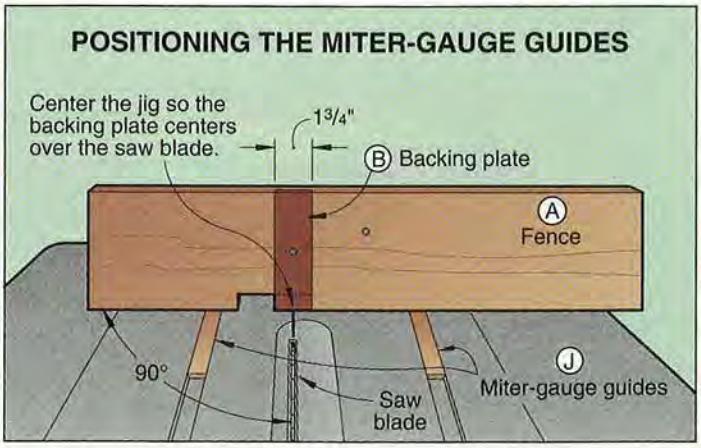
CUTTING DIAGRAM

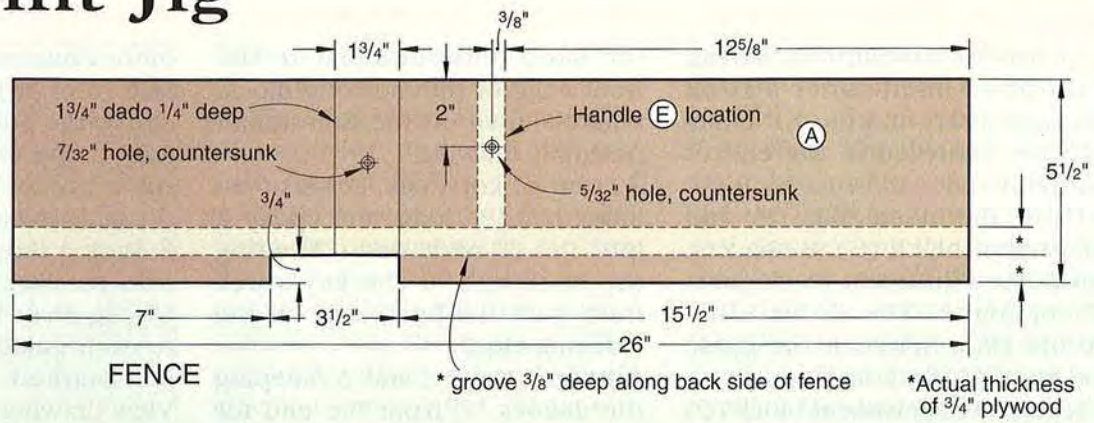


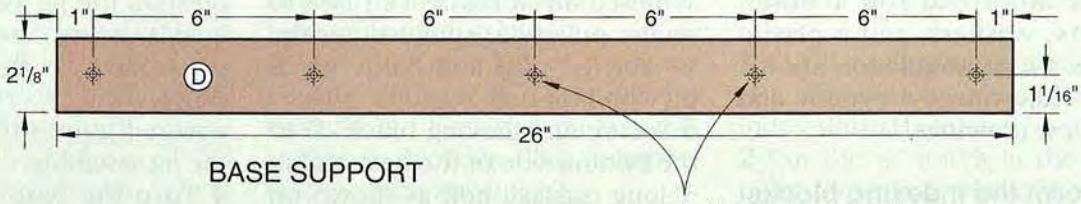
POSITIONING THE MITER-GAUGE GUIDES

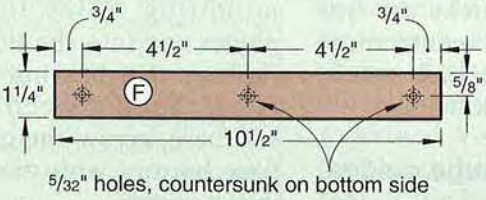


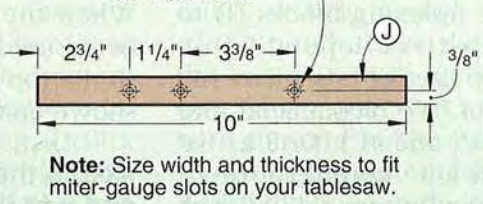
Box-Joint Jig

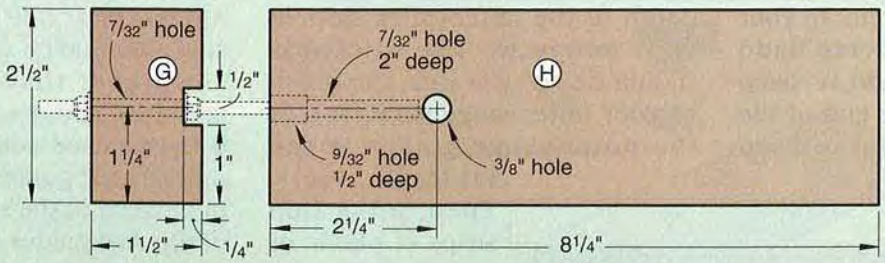
PARTS VIEW

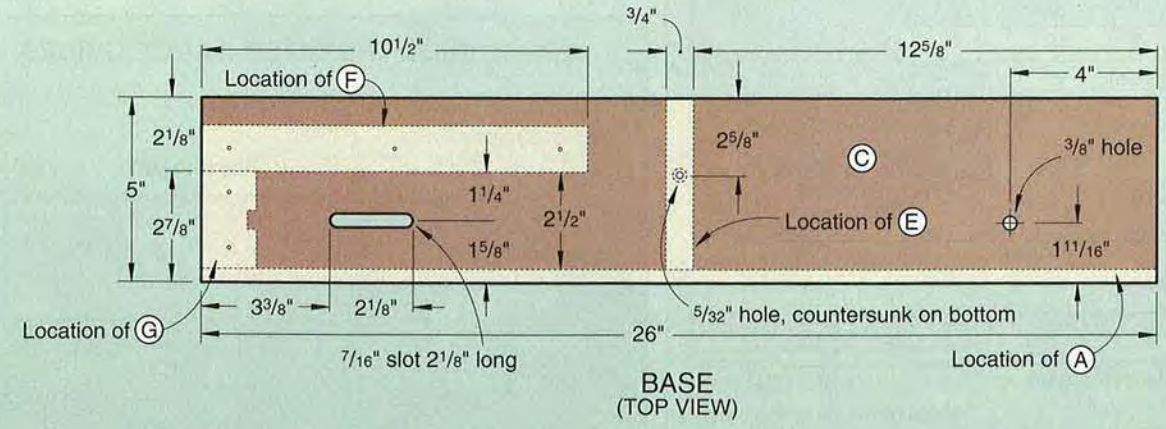










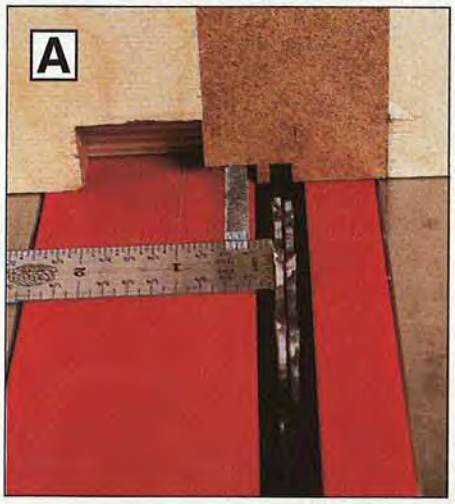


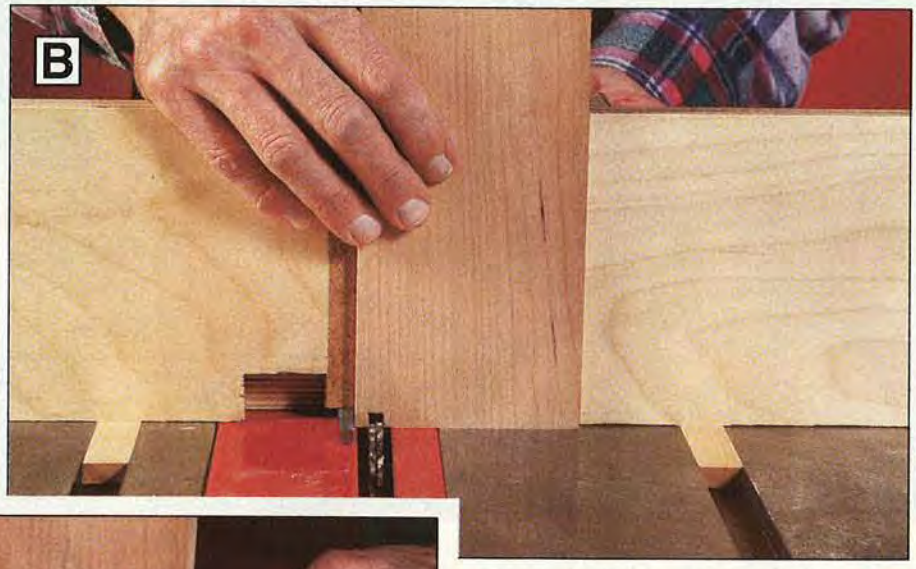
How to make your box-joint jig do its thing

Adjust or shim the dado blade to the same thickness as the wood being box-jointed. Raise the blade to the same height as the thickness of the material being cut *plus* 1/32". As shown in *photo A*, adjust the distance between the blade and indexing pin so the distance is equal to the width of the blade. It may be necessary to remove the backing plate (B), and notch it to get the pin close enough to the blade. As shown in *photo B*, slide your stock against the pin, and make the first cut. Position the notch just cut onto the index pin, and make the second cut as shown in *photo C*. Repeat until the piece is completely cut across one end. For the mating piece, place the first test piece on the index pin so just one finger is on the blade side of the pin. Position the second piece firmly against the first piece, and make the cut as shown in *photo D*. Remove the first piece, and make the cuts along the end of the second piece.

Test-fit the two pieces together. Chances are you'll need to adjust the distance between the blade and pin. If the fit is too loose, turn the knob clockwise to increase the distance between the pin and blade. If the fit is too tight, turn the knob counterclockwise to decrease the distance.

Test-cut scrap material until the joints fit perfectly. With the index pin properly located, lock the index slide in place with the large plastic knob.





Produced by Marlen Kemmet Project Design: Jan Hale Svec; Gary Webster Illustrations: Kim Downing Photographs: John Hetherington

It's a Keeper

Do you keep back issues of *WOOD*® magazine for reference—and for those build-someday projects? If so, this handsome and handy magazine file box is a build-now (and build-a-bunch) project.

Rustle up some thin stock

The magazine file calls for ¼"-thick stock 11½" wide. You could construct the file of plywood. But if you want to use solid mahogany as we did, here's how.

1 Joint one edge of a ¾×6×30" piece of mahogany. Resaw it into two ⅜"-thick pieces.

2 Edge-glue the two resulting pieces along the jointed edges, both sawn surfaces facing up. (This is called *book-matching*.)

3 Plane the book-matched stock to ¼" thick. Plane several pieces of scrapwood to the same thickness for setting up the box-joint jig later.

4 Rip the piece to 11½". Refer to the Bill of Materials, and cut parts A, B, and C to finished length plus 1/16". (The extra length allows you to make the joint fingers 1/32" longer. You can then sand the joints flush after assembly.) Leave the parts overwidth at 11½" for now. Mark a bottom edge on each piece.

Tackle the box joints next

1 Refer to the article beginning on *page 44* for instructions on building and using our box-joint jig.

2 Install a ¼" dado blade on your tablesaw. Adjust the saw's cutting depth to 9/32".

3 Install the jig's ¼" indexing pin.

(If you're cutting the box joints with another type of jig, install it and set it up for ¼" fingers 9/32" long, following applicable instructions.)

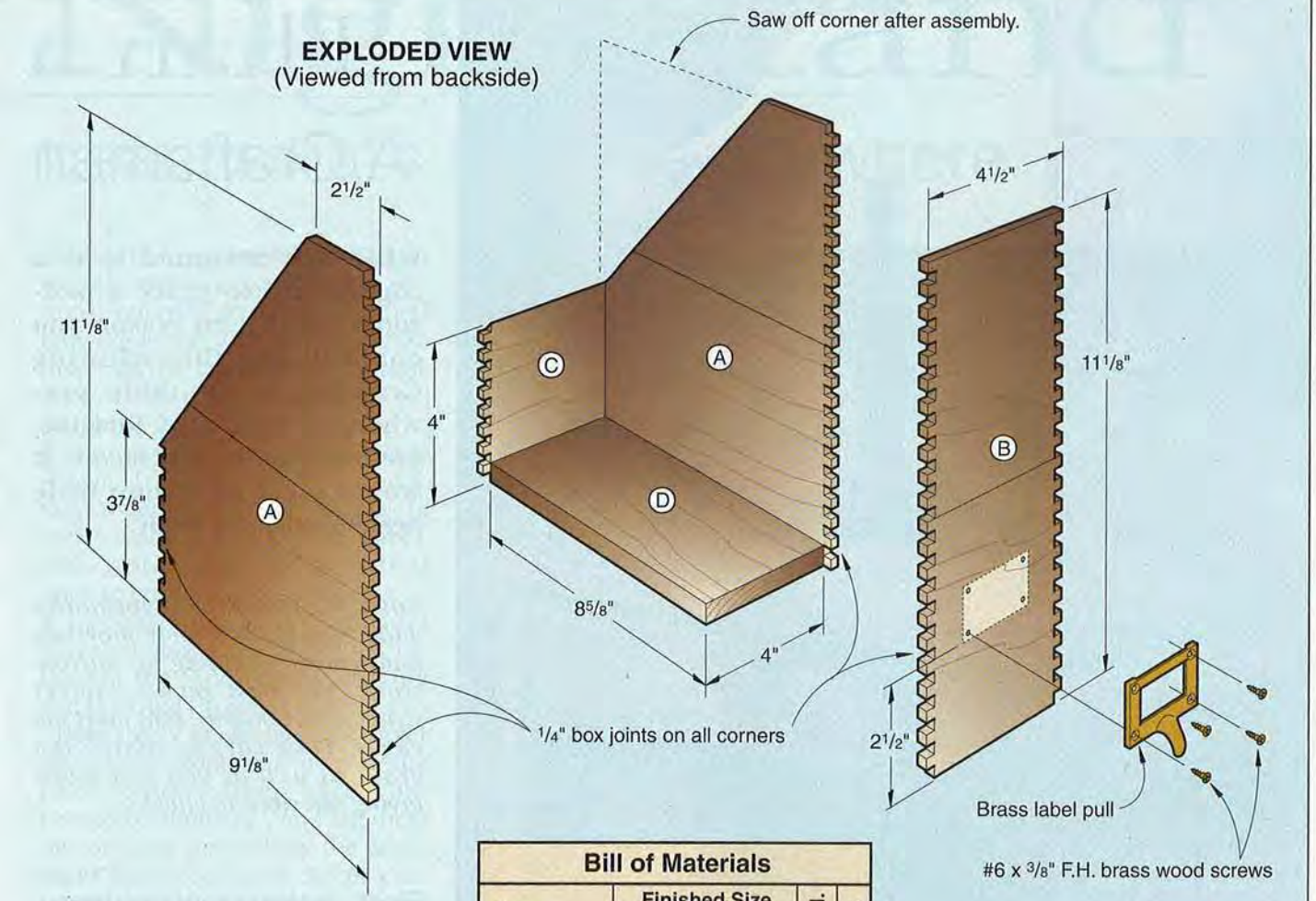
4 Saw fingers in two pieces of scrapwood, and test the joint for fit. Adjust and retest as necessary.

5 With the jig properly adjusted, saw fingers on both ends of parts A, B, and C, starting with a finger at the bottom of each side (A) and mating fingers on parts B and C.

6 Rip the sides (A) and back (B) to finished width, sawing the waste off the top edge. (For appearance, you could make the parts slightly

Print this article

Neat, orderly storage for your *WOOD*® magazines



Bill of Materials

Part	Finished Size			Matl.	Qty.
	T	W	L		
A* side	¼"	11⅛"	9⅛"	M	2
B* back	¼"	11⅛"	4½"	M	1
C* front	¼"	4"	4½"	M	1
D bottom	½"	4"	8⅝"	M	1

*Make oversize initially, then cut to finished size in accordance with how-to instructions.

Materials Key: M–mahogany

Supplies: Drawer pull with card holder, semi-gloss clear lacquer.

wider if necessary to avoid cutting through a finger.) Cut the front (C) to the same width as A and B, but not to the finished width shown. Sand the inside faces.

Build the box, cut a corner

1 From scrapwood, cut four clamping cauls, two that measure ¾×7¾×11¼" and two that are ¾×2¾×11¼".

2 Cut the bottom (D) to the dimensions shown in the Bill of Materials. Dry-assemble parts A, B, C, and D to check fit.

3 Apply white glue to the inside edges of each joint finger, using a small brush. (White glue's longer open time allows you to glue and assemble all the joints before it starts to dry.) Apply glue along the edges and ends of the bottom.

4 Assemble the file box. Position the clamping cauls on the sides and ends, and clamp the assembly with band clamps. (We used three.) Ensure that the bottom is flush and the joints are tight. Clamp until the glue dries. Sand the joints flush.

5 Lay out the angled cutting line on one side of the file box. Bandsaw the angle, cutting with a fine-toothed blade. (To minimize chip-out, apply wide masking tape along the cutting line on the inside of the side that will be up when you saw and the outside of the one that will be on the bottom.) Plane or sand the sawn edge smooth and straight.

6 Finish-sand the box, using progressively finer sandpaper from 150- to 320-grit. Sand slight roundovers on the opening's edges.

7 Apply a clear finish. (We sprayed on several coats of semigloss lacquer, sanding between coats.)

8 Attach a brass file handle where shown. Poke screw pilot holes with an awl. (We installed the 2½×1½" Large Card Holder with Pull, available for about $6 from Woodcraft Supply, 800/225-1153.)

Project Design: Gary Webster Photograph: Marty Baldwin Illustrations: Kim Downing; Lorna Johnson

More Than a

A Craftsman

While we designed it as a nightstand to grace a bedroom, there's no reason you couldn't put this winning Craftsman-style table anywhere in the house. Imagine, for instance, how perfectly it would serve as a lamp table beside your easy chair.

Note: *We made the nightstand's wide panels with their mortises and tenons by gluing up narrow stock. For best results, select straight, flat boards, and joint the edges. Take care to match the grain as well as you can when laying out stock to glue up.*

First, make a few fixtures

1 Referring to the Gluing Fixtures chart on the *opposite page* cut scrapwood to size for fixtures AA–EE. (We cut a piece of hardboard for AA, and made parts BB–EE from MDF.)

2 Saw notches in fixtures BB and CC as shown in the Gluing Fixtures drawing.

Glue up the sides

1 Rip and crosscut parts A and B to the sizes shown in the Bill of Materials on *page xx*.

2 Form the decorative cutouts in the meeting edge of each part A.

To do this, photocopy the Cutout Full-Size Pattern on *page xx*. Cut out the pattern copy to make a template. Position the template on the parts where indicated, and trace the cutout line. Saw the cutouts, using a bandsaw with a ⅛" blade, a scrollsaw, or a jigsaw.

Print this article

Nightstand

beauty that's at home anywhere

3 Glue the centers (A) and fillers (B) into two side panel center sections, referring to the Side Panels drawing in the *WOOD PATTERNS®* insert in the middle of the magazine. Both ends of each panel should be flush. Clamp.

4 Cut parts C–F to the sizes shown. To make parts D, E, and F, tape together four 30" lengths of ¾×¾" stock into a 3"-wide panel, and crosscut each set of parts at once to ensure identical lengths.

5 Dry-assemble the side panel outer sections from parts C–F, following the Side Panels drawing and the Glue-Up detail, *right*.

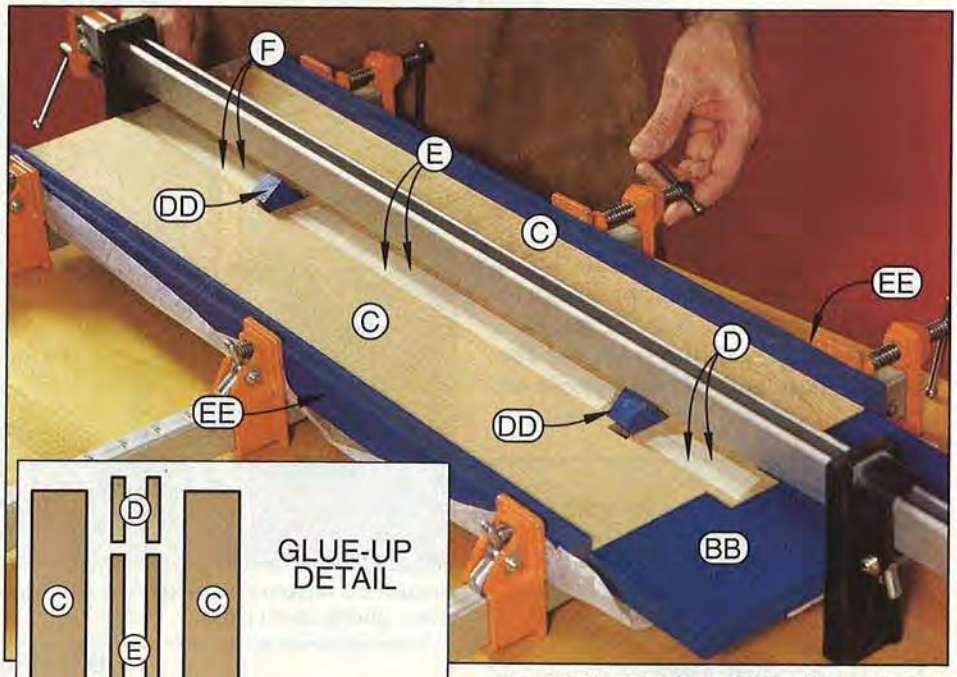
Here's how to assemble the outer sections in pairs, as shown in the photo *right*. Open three bar clamps to about 12", and lay them out on your bench. Lay the alignment board (AA) on them, centered between the jaws. Cover the board with waxed paper.

Separate the four taped-together parts D, E, and F into two taped-together pairs. Then, referring to the Side Panels drawing and the photograph, lay one part C, the paired parts D, E, and F, and another part C on the clamps. Slip the spacers (DD) into the mortises where shown. Place fixture BB on the top (tenon) end, and pull the parts tight with another clamp positioned lengthwise, as shown.

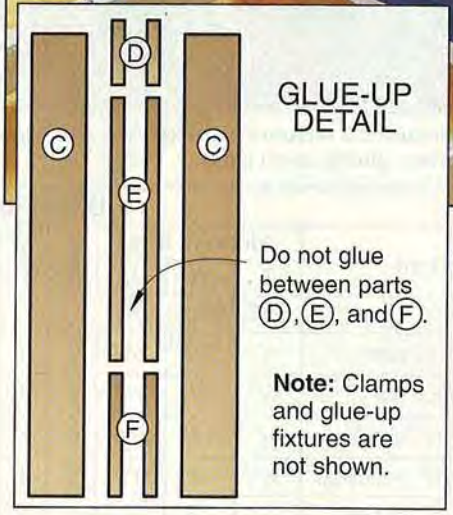
Ensure that all parts fit together snugly, then loosen the clamps. Apply glue to the *outside edges only* of the taped-together parts D, E, and F where they join the parts C. Clamp until dry, removing the glue from the tenon end of parts D, along with any squeeze-out.

6 Remove the tape to separate the two side outer sections (C/D/E/F assembly). Dry-assemble the outer

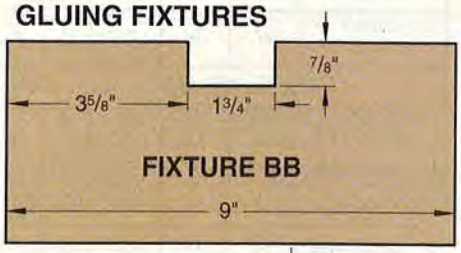
Continued



The lengthwise bar clamp pulls the mortise and tenon components (D, E, and F, taped together in pairs) into position. Fixtures BB and DD ensure correct tenon length and mortise size.



GLUING FIXTURES



Gluing Fixtures					
Part	Finished Size			Matl.	Qty.
	T	W	L		
SIDE PANEL					
AA alignment board	¼"	6"	32"	S	1
BB single tenon gauge	¾"	4"	9"	S	1
CC double tenon gauge	¾"	4"	18"	S	2
DD spacer	¾"	1"	1¼"	S	2
EE long caul	¾"	1¼"	28⅛"	S	2

Material Key: S–scrapwood

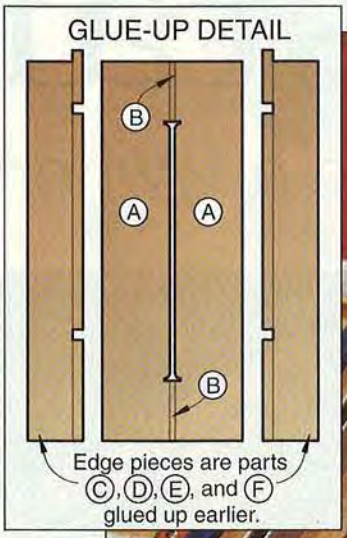
Nightstand

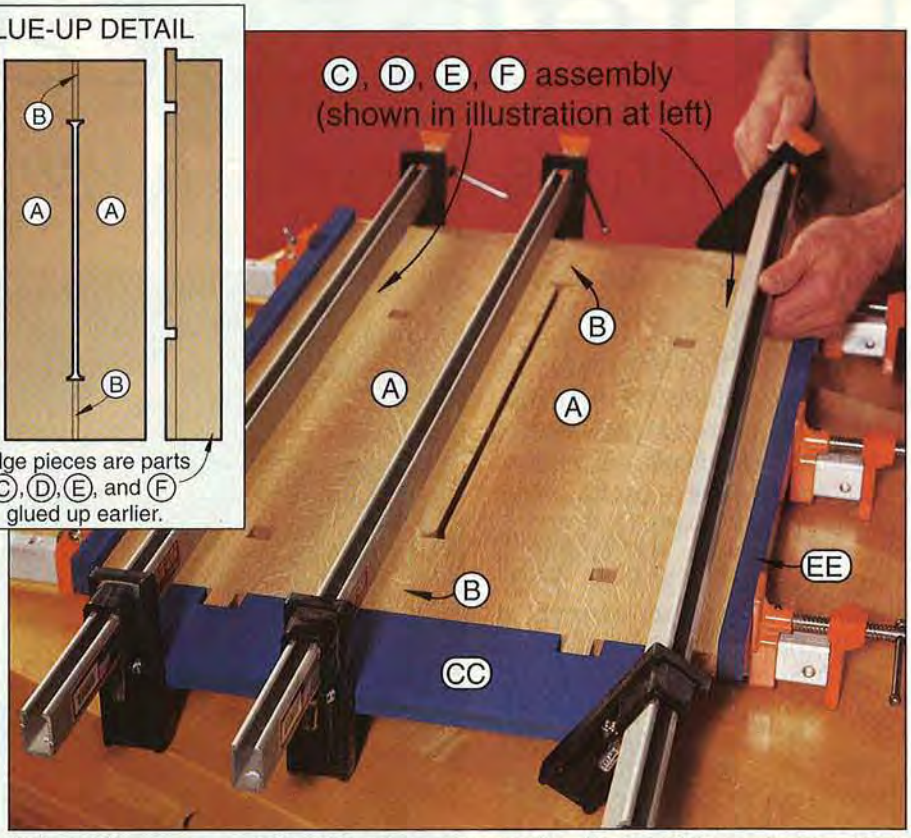
sections to a center section (A/B assembly). After positioning the assemblies in the cross clamps, pull the top (tenoned) ends flush, using fixture CC as shown *right*. Then, glue and clamp.

7 Saw a ⅛" spline slot in the inside face of each side panel where shown. To do this, position your tablesaw's fence 2⅛" from the center of the blade on the right side. Place a stopblock to set the kerf's length, and cut the slot in the right side panel. Move the fence to the left of the blade and repeat the operation to form the slot in the left side panel.

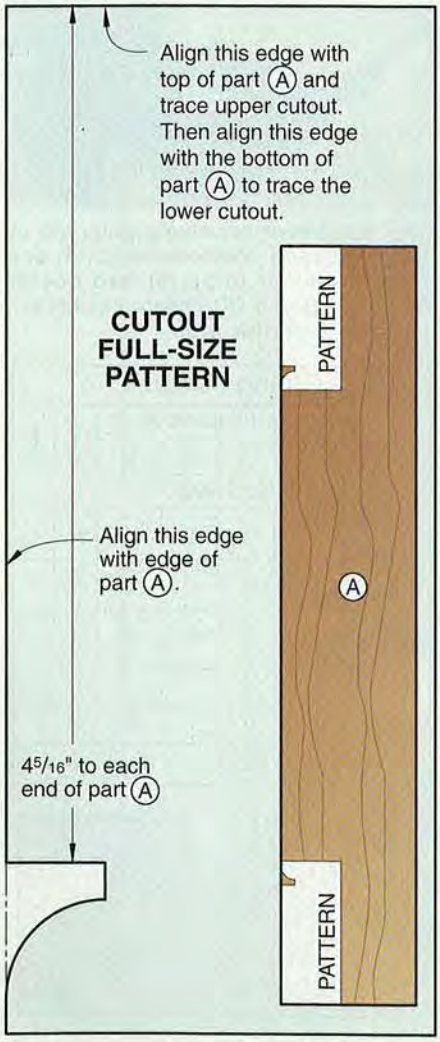
8 Lay out the cutting lines for the sloped edges and arched bottom on

Continued





Fixture CC ensures a straight top when gluing up the side panel. Keep surfaces flush when gluing up all parts.


Align this edge with top of part Ⓐ and trace upper cutout. Then align this edge with the bottom of part Ⓐ to trace the lower cutout.
CUTOUT FULL-SIZE PATTERN
PATTERN
Align this edge with edge of part Ⓐ.
A
4⁵/₁₆" to each end of part Ⓐ
PATTERN

Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
SIDE PANEL					
A center	¾"	4⅞"	27¼"	O	4
B filler	¾"	¼"	4⁵/₁₆"	O	4
C outside	¾"	3¼"	27¼"	O	4
D* mortise top	¾"	¾"	3⅞"	O	4
E* mortise center	¾"	¾"	15½"	O	4
F* mortise bottom	¾"	¾"	7¼"	O	4
SHELVES AND APRON					
G shelf center	¾"	10"	18½"	O	2
H lower edge	¾"	1½"	18½"	O	2
I tenon	¾"	¾"	20¼"	O	4
J upper edge	¾"	¾"	18½"	O	2
K back apron	¾"	4⅞"	18½"	O	1

Part	Finished Size T	W	L	Matl.	Qty.
TOP					
L** center	¾"	10"	22"	O	1
M** edge	¾"	3¼"	22"	O	2
N** mortise end	¾"	¾"	1"	O	4
O* mortise center	¾"	¾"	18½"	O	2
DRAWER					
P side	½"	2¹⁵/₁₆"	13"	O	2
Q front	½"	2¹⁵/₁₆"	17⅞"	O	1
R back	½"	2⁹/₁₆"	17⅞"	O	1
S bottom	¼"	11¾"	17⅞"	OP	1
T face	¾"	4¹³/₁₆"	18⅜"	O	1

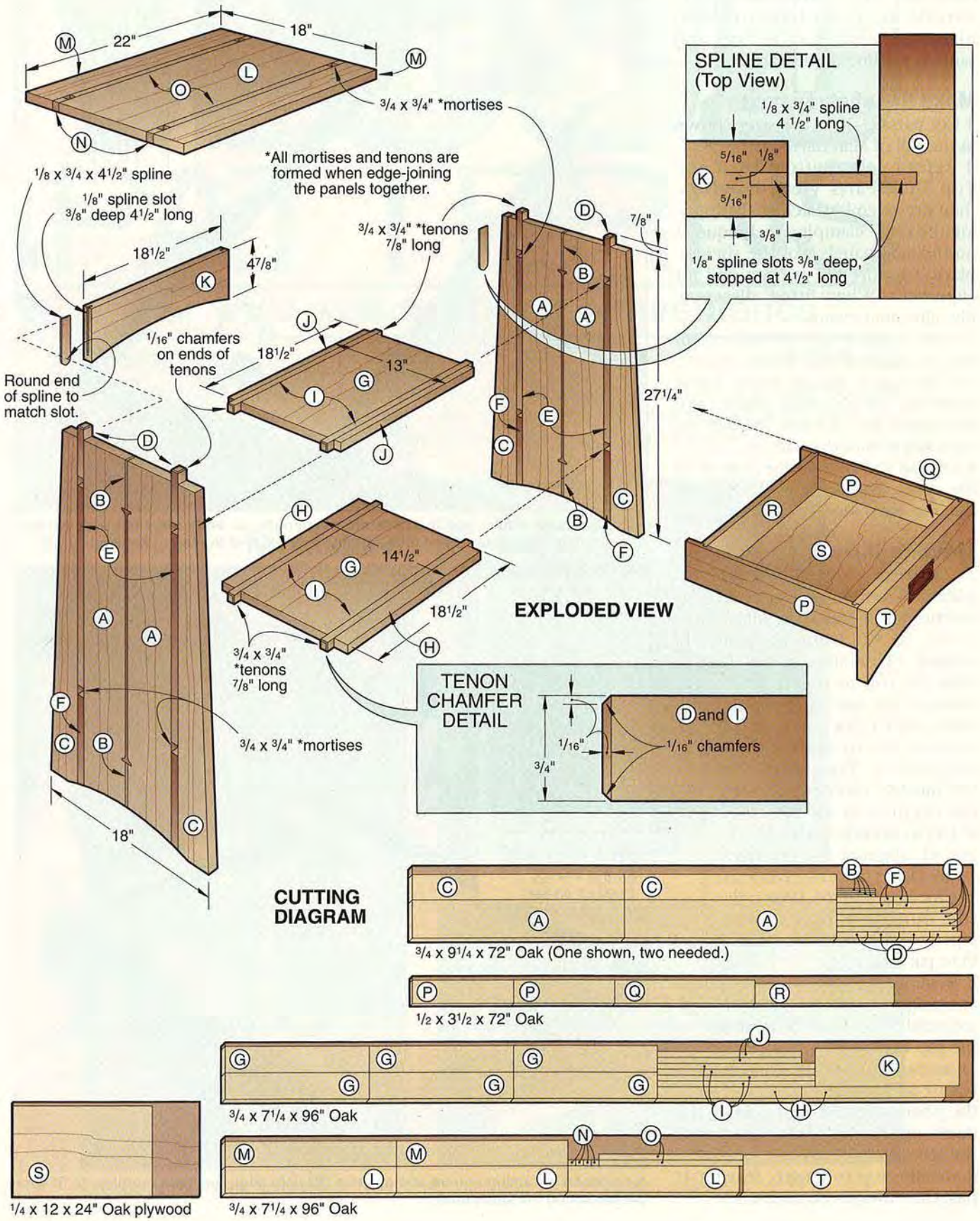
*Cut from longer stock in sets of four or pairs, in accordance with how-to instructions.

**Make longer initially, then trim to finished length in accordance with how-to instructions.

Materials Key: O–white oak, quartersawn; OP–oak plywood.

Supplies: Mission-style drawer pull (see Buying Guide), #8×1" flathead wood screws, ¾"×17 gauge wire nails, clear finish.

Buying Guide
Mission-style small pull, 2¾×1¾", catalog no. 123875, about $7 (call for current price and shipping charges). Woodcraft, 800/225-1153.


22"
18"
3/4 x 3/4" *mortises
1/8 x 3/4 x 4 1/2" spline
1/8" spline slot 3/8" deep 4 1/2" long
*All mortises and tenons are formed when edge-joining the panels together.
3/4 x 3/4" *tenons 7/8" long
18 1/2"
4 7/8"
1/16" chamfers on ends of tenons
13"
Round end of spline to match slot.
7/8"
27 1/4"
SPLINE DETAIL (Top View)
1/8 x 3/4" spline 4 1/2" long
5/16"
1/8"
3/8"
1/8" spline slots 3/8" deep, stopped at 4 1/2" long
14 1/2"
EXPLODED VIEW
TENON CHAMFER DETAIL
D and I
1/16" chamfers
3/4"
CUTTING DIAGRAM
3/4 x 9 1/4 x 72" Oak (One shown, two needed.)
1/2 x 3 1/2 x 72" Oak
3/4 x 7 1/4 x 96" Oak
1/4 x 12 x 24" Oak plywood
3/4 x 7 1/4 x 96" Oak

each side panel. Bandsaw slightly outside the lines. Joint or hand-plane the edges to the line, and sand to the line on the arch.

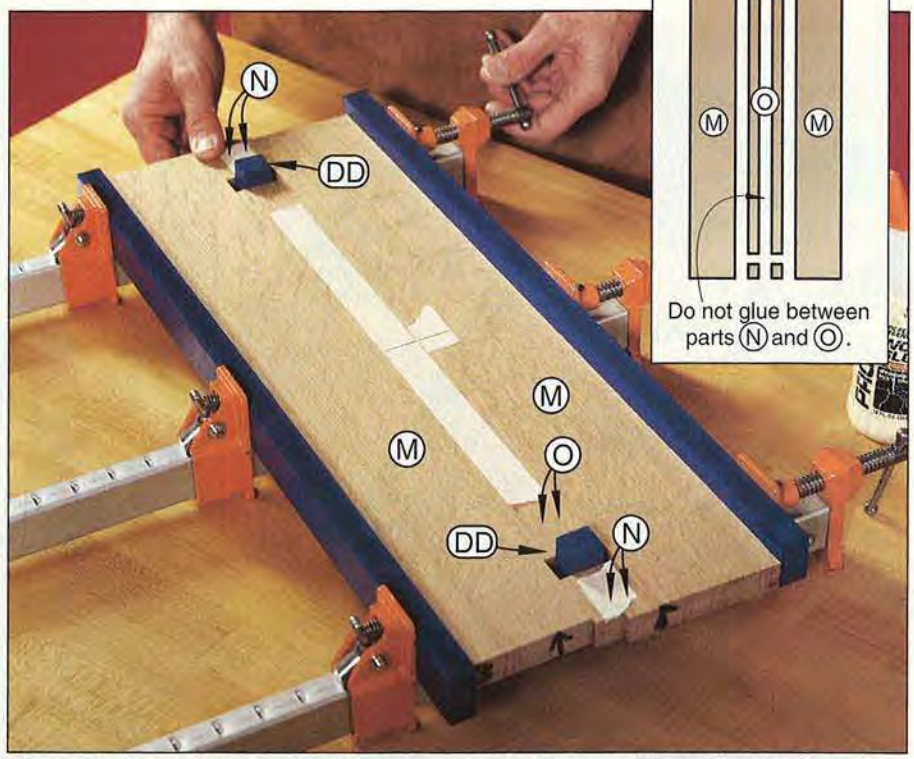
Make the shelves next

1 Cut parts G–K to the sizes shown in the Bill of Materials.

2 Refer to the Bottom Shelf and Top Shelf Parts View drawings, then dry-assemble each shelf, applying the same clamping technique as on the side panels. For the shelves, place a fixture CC at each end for alignment. When fitted, disassemble, glue, and clamp.

3 Form a spline slot in each end of the back apron (K) where shown on the Back Apron Parts View drawing. (We used a router and slot-cutter bit.) Center the slot on the thickness of the part.

4 Lay out the arch on the bottom of the apron. Bandsaw slightly outside the line, then sand to the line.



The top's outer edges and mortises are overlength, so ends need not look perfect. After joining these assemblies to the center, you will trim the top to finished length.

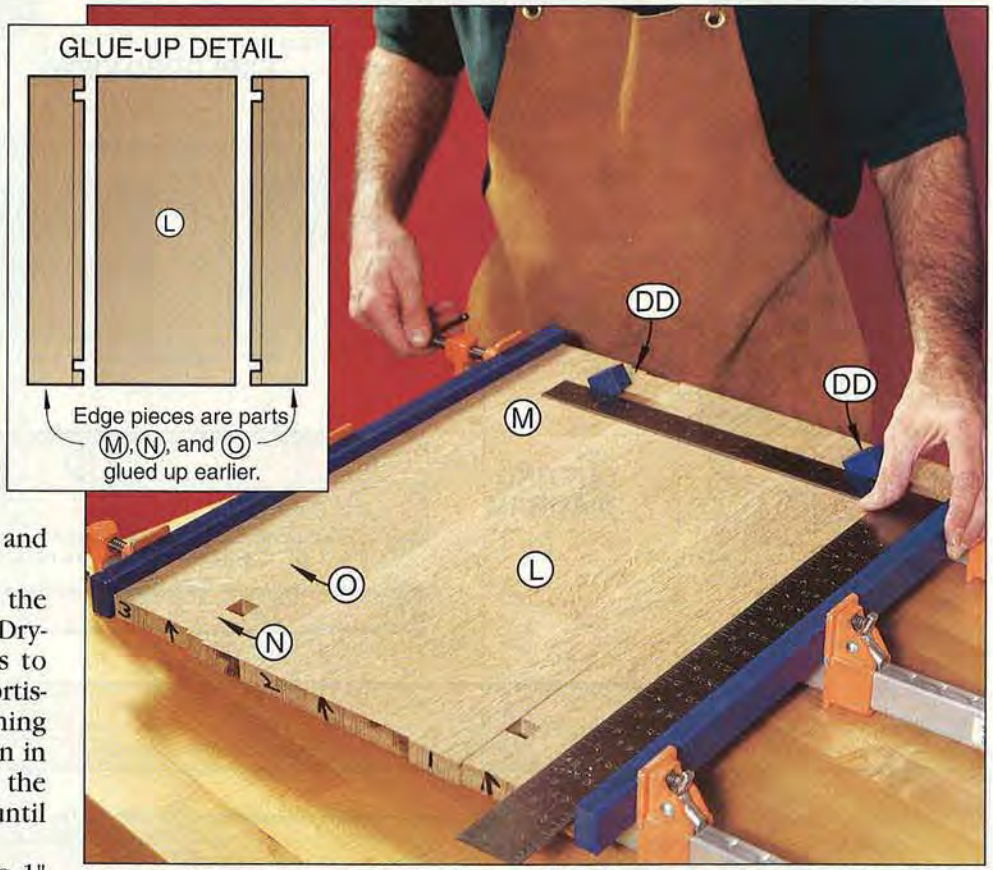
Move to the top

1 Cut parts L and M to size, adding 1" to the length shown on the Bill of Materials. Make parts N ½" longer than shown. (This allows you to trim the top to length after gluing it up, leaving perfectly flush ends.) Cut the mortise centers (O) to the finished size shown. Tape stock for the mortise centers together, and cut them in one pass.

2 Dry-assemble parts M, N, and O, aligning the mortises with the spacers (DD) as shown *above right.* Glue only the outside edges of the taped-together mortise parts N and O to parts M.

3 Remove the tape to separate the two edge assemblies (M/N/O). Dry-assemble the edge assemblies to the top center (L). Align the mortises across the top, using a framing square and spacers DD as shown in the photo *right.* Then, unclamp the parts, apply glue, and clamp until the glue dries.

4 Cut the top to length, leaving 1" past the mortises on each end.



A carpenter's framing square and spacers DD help align the top's mortises to fit over the tenons on the side panels.

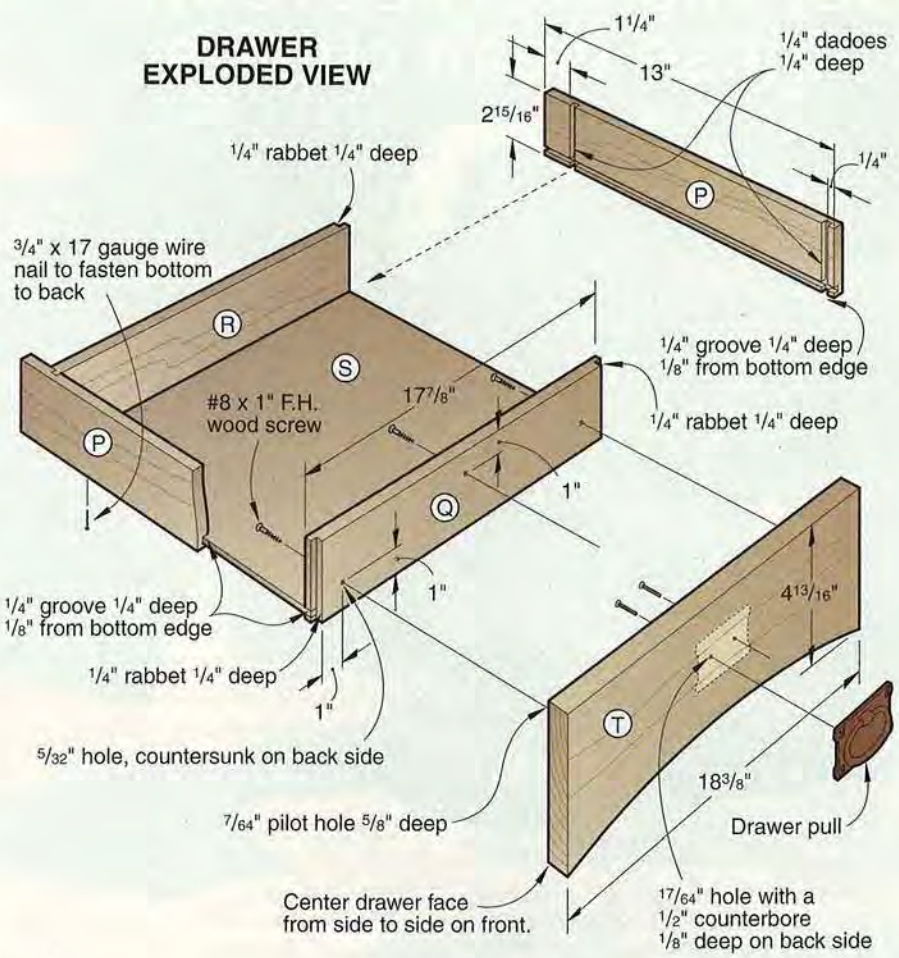
Put all the panels together

1 Chamfer the tenon ends, referring to the Tenon Chamfer detail. (We chamfered the tenons with a file; sanding would work, too.)
2 Cut two ¾×4½" splines from ⅛"-thick hardboard or plywood. Shape them to fit into the curved ends of the slots.
3 Sand the side panels, shelves, back apron, and top. Be careful not to round the tenon corners or make the tenons smaller when sanding.
4 Referring to the Exploded View drawing, dry-assemble the side panels, shelves, and back apron (K) with splines. Arrange clamps and protective pads, then disassemble the parts.

Apply glue to the joints. (We recommend white glue for this large assembly—it allows longer working time.) Reassemble the parts, and clamp. Check for square by measuring diagonally across the back. Wipe off glue squeeze-out.
5 Without gluing, fit the top over the tenons on the side panels. Arrange your clamps and pads, then remove the top. Apply glue, reinstall the top, and clamp.

A drawer completes it

1 Cut drawer parts P and Q to the dimensions shown.
2 Form a ¼" groove ¼" deep in the sides (P) and front (Q) where shown. (The bottom [S] slides into these grooves. If the material you're using for the bottom doesn't measure exactly ¼" thick, adjust the groove width to match the actual thickness. The bottom of the groove should be ⅛" from the bottom edge of the sides and front.)
3 Cut parts R, S, and T to size. If you changed the dimensions of the groove in parts P and Q, you'll need to adjust the width of the drawer back R accordingly. Its width should equal the distance from the top of the groove to the top edge on parts P and Q.
4 Cut the ¼" dadoes in the sides (P) where dimensioned.
5 Rabbet the ends of the front (Q) and back (R) as indicated.



6 Glue and clamp the sides (P), front (Q), and back (R) together. Check for square by measuring diagonally across the bottom.
7 Slide the bottom (S) into the side and front grooves. Nail it to the back (R) with ¾"×17 wire nails. (For easier nailing, drill pilot holes through the bottom into the edge of the back.)
8 Lay out the arch on the drawer face (T), and bandsaw slightly outside the line. Sand to the line.
9 Drill three 5⁄32" holes through the front (Q) where shown. Countersink them on the inside of the drawer. Clamp the face (T) to the front, flush with the top and both ends. From inside the drawer, drill three 7⁄64" pilot holes ⅝" deep into the face.
10 Lay out locations for the drawer-pull holes on the front of the face. Drill 17⁄64" holes through the face, with ½" counterbores ⅛" deep on the back side.

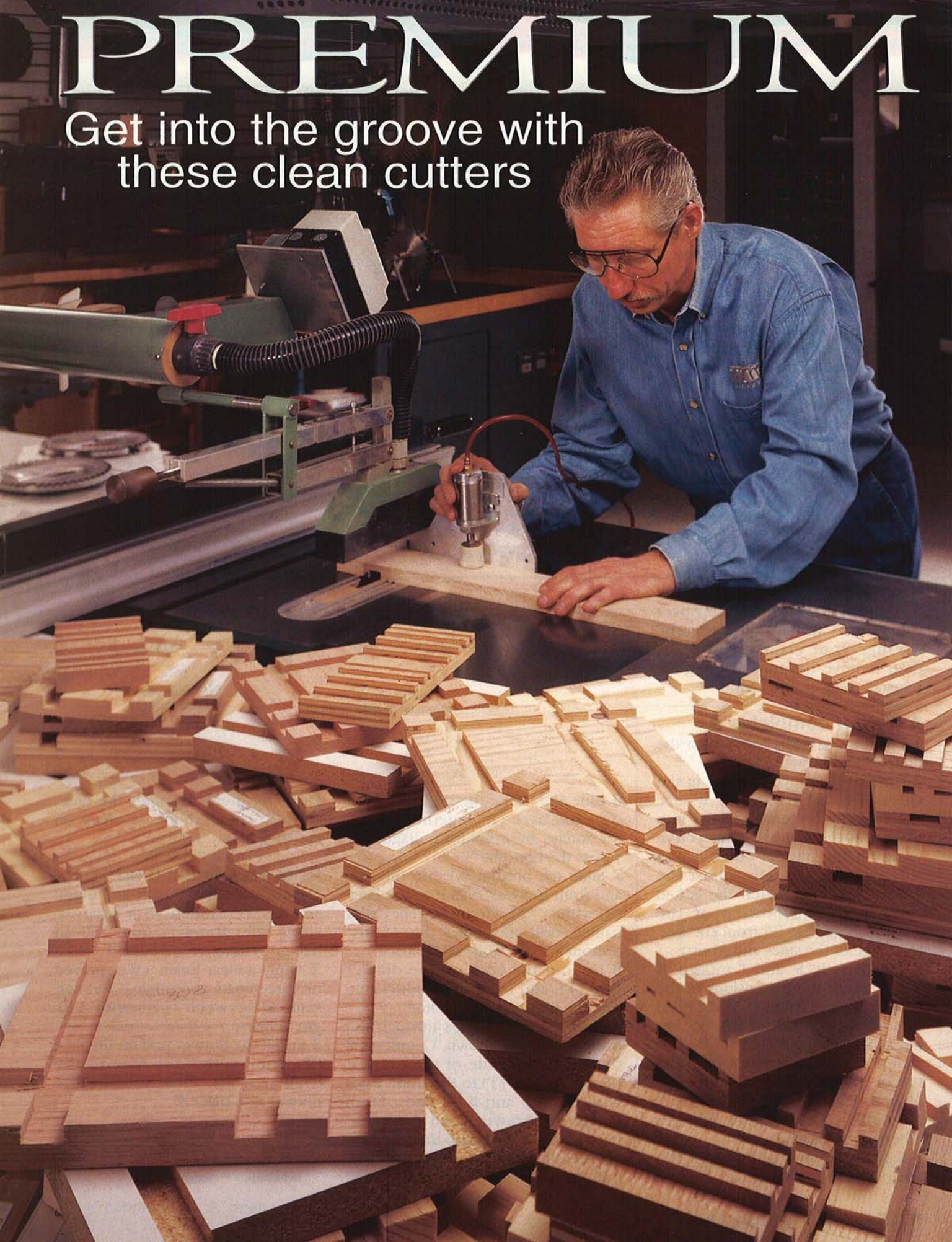
Now, let's finish it up

1 Finish-sand the drawer and nightstand. (We sanded with progressively finer abrasives from 150- to 320-grit.) Remove all dust.
2 Apply a clear finish. (We sprayed on three coats of semigloss lacquer, sanding between coats with 320-grit abrasive.)
3 Install the drawer pull on the face (T), then screw the face to the drawer front. Finally, slide the drawer into place.

Project Design: James R. Downing
Illustrations: Kim Downing; Lorna Johnson
Photographs: Marty Baldwin; Hetherington Photography

PREMIUM

Get into the groove with these clean cutters



DADO SETS

With cabinet-grade ¾" hardwood plywood costing up to $80 per sheet, it makes sense to machine such precious materials with tooling that yields clean cuts. For dado work, that means using one of the 14 premium models priced between $90 and $290 we tested for this article.

Fast facts

- Only sets costing $180 and up will give you clean cross-grain cuts in hardwood plywoods. But, you can improve the performance of others greatly with the addition of a zero-clearance insert for tablesaws. We'll tell you all about these inserts, and how to make them.
- For clean cuts, buy a set with negative-hook teeth. For fast cuts and easy workpiece feeding, get a set with positive-hook teeth.
- If you're considering a shimless set, read this article carefully. We had mixed results with these products.

A few words about the sets in our test

For this article we reviewed 8"-diameter sets—the most popular size for tablesaws that accept 10" blades. Several manufacturers sell 6"-diameter blades similar to those we tested. These sets sell for about $10–$20 less than their big brothers. They make sense if you have a saw with a universal motor, or induction motor of less than 1½ horsepower. An 8" set yields dadoes up to about 2" deep, and a 6" set cuts to about 1" deep on most saws. You may find the capacity of an 8" set handy for cutting tenons or deep finger joints.

Our tested blades cut dadoes from ¼" to 13/16" wide. Some of the manufacturers rightly claim that you can cut a dado as wide as 29/32" wide with their sets—if you use every chipper and shim in the set. But, we find trying to do that impractical. Why? If you put a stack of blades wider than 13/16" on most tablesaws you will be left with little arbor thread for the arbor nut to hold on to.

How we tested the sets

As you can see in the chart at *the end of this article*, we tested the dado sets with a tablesaw and radial-arm saw. We precisely adjusted both machines to eliminate arbor runout as a source of poor cuts. On the tablesaw we also adjusted the fence parallel with the miter-gauge slot and blade body (an out-of-parallel fence can turn even the best dado set into a rough cutter). With both machines we cut oak plywood, solid oak, solid pine, and melamine-coated particleboard.

On the tablesaw we made ½"-deep, ¾"-wide cuts, both cross-grain, and with-grain in 8"-square test pieces guided along the fence. Nearly all of the sets excelled in the with-grain cuts, but some chipping popped up in cross-grain cuts. To verify those cross-grain results, product tester Bob McFarlin outfitted a precision miter gauge with a custom-designed aluminum backplate and air-powered hold-down clamp. (See photo *left*.) With this rock-steady setup, he made another series of crosscuts.

Still, some of the sets made chips with cross-grain cuts, so we repeated the cross-grain tests with a zero-clearance insert in the tablesaw. (See *page 33* for information on making inserts.) This made a dramatic improvement in many of the sets, as you can see in the chart and in the photo *above right*.

If you just don't want to hassle with making zero-clearance inserts—you'll need one for each width of dado cut you make—buy a dado set that excels even without inserts. You'll spend at least $180. But, you can save some money by making inserts. Just buy a blade, such as the Delta 35-535 at $95, or the Freud SD208 at $90, that crosscuts plywood with good results if you use an insert.

In the radial-arm saw portion of the chart, you will see that we made cross-grain cuts by both *pulling* and *pushing* the set through the workpieces. The pulling motion produced better results with most of the sets, but we found it to be an unsafe practice. Even when we reduced the size of the test cuts to ¼" deep and ½" wide, the dado sets tended to climb or lurch toward us. Pushing the set through the workpiece reduced the climbing, but also lowered the quality of the cuts. Our advice: Don't use a radial-arm saw for dado work.

Several of the tested sets made chip-free cross-grain cuts in oak plywood only when used with a zero-clearance insert in the tablesaw. Without an insert, the results were poor.

Left: **Product tester Bob McFarlin made hundreds of cuts in various materials to arrive at our performance grades.**

Continued

Print this article

PREMIUM DADO SETS

3 key features that separate great sets from good sets

• Well-made, accurate chippers make a difference. Many of the top-performing sets in our test have four-tooth chippers that tend to chip out less when the set exits its cut. The four-tooth chippers don't "hammer" the bottom of the cut, vibrate less, and feed through the cut more smoothly.

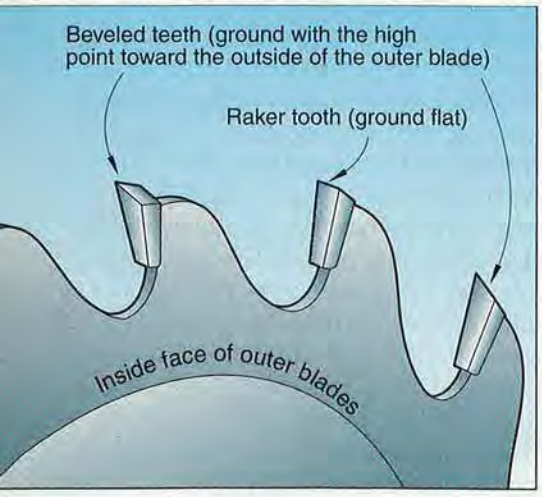
The better-performing sets have raker teeth on their chipper blades that are precisely ground to the same height as the raker teeth on the outer blades. (Outer blades have beveled and raker teeth as shown *below*. Chippers have only raker teeth.) If the raker teeth on the chippers are not ground to the same height, or if the arbor hole is slightly sloppy, the set will not cut a flat bottom.

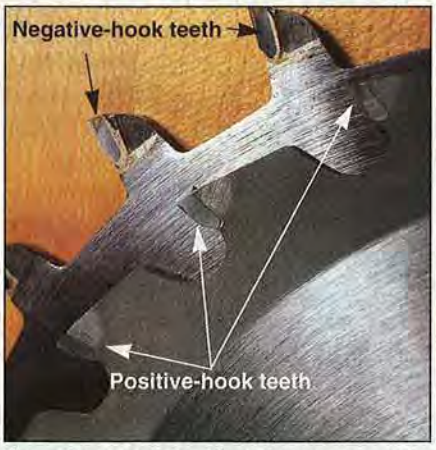
We also found that several of the sets have features that make them easier to stack together in precise widths. In the past few years some manufacturers—CMT, Forrest, Jesada, and Freud with its SD508 set—have added a 3⁄32"-thick chipper. (Other sets have only 1⁄4", 1⁄8", and 1⁄16" chippers.) With the 3⁄32" chipper we could arrange the sets for precise cutting widths with less shimming.

Our stacking procedure was further simplified with the Forrest set because of the precise thicknesses of its plates. As you can see in the chart, we stacked together all of the sets without shims for what—in theory—should have been 1⁄4"-, 1⁄2"-, and 3⁄4"-wide cuts. Only the Forrest set was exactly 1⁄4" and 1⁄2" wide without shims. For a 3⁄4"-wide cut, it and the CMT, Freud SD208, and Systimatic 1740 were off by .005" or less. In the chart we show in thousandths of an inch how much the sets exceeded (+ readings) or fell short (- readings) of the desired cutting widths.

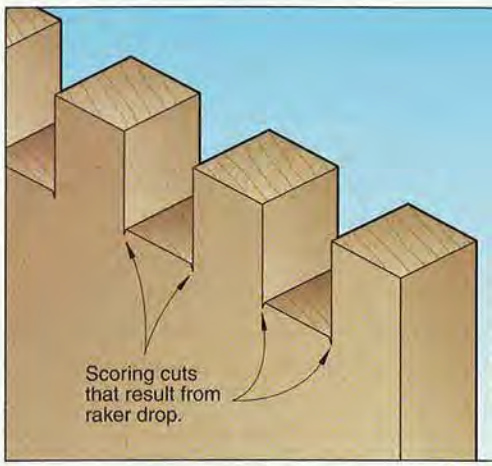
• Outer blades that slice cleanly virtually eliminate tearout. The sets that leave no splinters or chips on dado edges have beveled teeth with sharp cutting edges free of any micro-chips in their carbide surfaces. We also found in our testing that the blades with negative-hook teeth make consistently better cuts in all materials, especially when making cross-grain cuts without zero-clearance inserts. As shown in the photo *below*, negative-hook teeth angle back from an imaginary line running from the center of the blade to its outside. On the other hand, positive-hook teeth pitch forward from that imaginary line.

So why do manufacturers make dado sets with positive-hook teeth? Because positive-hook sets feed with greater ease and speed, especially in hardwoods—an important consideration for production work.


Beveled teeth (ground with the high point toward the outside of the outer blade)
Raker tooth (ground flat)
Inside face of outer blades



Negative-hook teeth cut more cleanly than positive-hook teeth that cut with greater ease and speed.



• Raker drop affects the final look of the cut. For clean dado walls, manufacturers grind the tips of the beveled teeth slightly higher than the raker teeth. This produces a tiny V-shaped scoring cut in the dado corners as shown *above*. We refer to the depth of this V cut as raker drop, and in the chart we list this dimension for each set. If you frequently use a dado set for cutting box joints or other cuts where the end of the dado cut is exposed, choose a set with little raker drop.

Of the various shims available we prefer magnetic ones for handling ease.

Here's the skinny on shims

Because of the varied thicknesses of sheet goods and solid stock, you almost always have to use shims to adjust the width of a dado cut so the material fits into it properly. More than half of the tested sets come with shims. (Two products don't require shims—more on that later.) As you can see in the photo *previous page bottom right*, shims come in numerous shapes, materials, and thicknesses.

Of the various types, we especially liked the Systimatic shims. They were the only ones that went on and off easily, and proved impossible to drop into the saw cabinet. You place these magnetic shims directly on the blade and they stay there when you put the blade on the saw arbor. The drawback: they come only in .010", .012", and .015" thicknesses (plastic shims come as thin as .002"). So when using them you may need a few thin sheets of paper for fine-tuning the width of some cuts. (The magnetic shims hold paper shims against the blade body.)

Easy-to-adjust, shimless sets: Have they arrived?

Two of the tested sets—the Freud Dial-A-Width Dado, model SD608, and Craftsman Excalibur Elite (also available as the DML Thoroughbred)—require no shims. Both products have a center hub that you turn to change the width of cut (see photo *above right*), but that's where all similarities end.

Like the other sets in this test, the Freud has two outer blades and a full set of chippers. After you assemble the set for the approximate cut width, you dial the red aluminum hub for fine width adjustments. As you rotate the hub, each click adjusts the cut width .004" in either direction. Reassembling the set for use on saws that tilt the blade to the left or right was a snap.

The Freud SD608 (left) and Craftsman Excalibur Elite do not require shims.

Although the adjustment feature worked perfectly, there were many dado sets in our test that produced slightly cleaner cuts at a lower price. Because of the added width of the hub, we found that we could safely make cuts up to only ¾" wide. At that point, only half of the threads on the arbor nut of our General 350-1 tablesaw were engaged on the threads of its 1¼"-long arbor.

The Craftsman set has one chipper. You leave it in place for cuts from ½" to 13/16" wide, and remove it for ¼"- to ½"-wide dadoes. The product comes set up for tablesaws that tilt the blade to the left (Craftsman, Powermatic 66, Jet Xacta Saw Left, and left-tilting versions of the Delta Unisaw). We tested the set on a General right-tilting saw. Disassembling it and reassembling it for use on that saw proved nothing short of difficult. All things considered, including cutting performance (see chart), we can't recommend this $200 product.

No matter which set you purchase, inspect it closely for chipped or unbrazed teeth.

Give your dado set a good once-over before using it

Before you put one of these dado sets on your saw, inspect it carefully for defects. In our test samples we found chipped teeth, teeth that were not completely brazed on (see photo *above*), and uneven plastic coatings.

All of the manufacturers will replace blades with defective teeth. In the case of the plastic coating—a rust-preventive measure found on all of the Freud sets except the SD208—you'll need to

Continued

PREMIUM DADO SETS

The Freud SD308, SD508, and SD608 sets come with a plastic coating that you need to remove with a solvent.

remove it with a solvent such as acetone or lacquer thinner. As shown *above*, this plastic layer can be uneven, preventing the blades and chippers from being stacked flush and parallel with each other.

Several of the tested blades have factory-glued-on shims on the inside surface of the outer blades. These shims must be used at all times because they provide clearance between the outer blade plates and the chipper teeth. In our two samples of the Freud SD308, these shims did not stick well to the plastic coating.

Here are the sets we rate tops in three price ranges

• ***Over $200:***

If you want excellent dado cuts in all materials, with or without zero-clearance inserts, buy the Forrest Dado King. It's high priced at $290, but comes with $45 in sharpening coupons.

• ***$150–$200:***

The nod here goes to the Freud SD508, CMT, and Jesada sets. These products performed with equal excellence in a tablesaw. The Freud was slightly better in a radial-arm saw, but you'll need to clean off its plastic coating. All of these sell for about $180.

HERE'S HOW WELL 14

BRAND	MODEL	NUMBER OF CHIPPERS	TEETH PER CHIPPER	NUMBER OF BEVELED TEETH PER OUTSIDE BLADE	NUMBER OF RAKER TEETH PER OUTSIDE BLADE	TOTAL NUMBER OF TEETH IN SET	(N) NEGATIVE OR (P) POSITIVE HOOK ANGLE	RAKER DROP (1) (INCH)	SHIMS INCLUDED (2)	TABLESAW PERFORMANCE (3) WITH ZERO-CLEARANCE INSERT: CROSS-GRAIN OAK PLYWOOD	WITH-GRAIN OAK PLYWOOD	CROSS-GRAIN SOLID OAK	WITH-GRAIN SOLID OAK	CROSS-GRAIN PINE	WITH-GRAIN PINE	MELAMINE-COATED PARTICLEBOARD
AMANA	658030	4	2	20	4	56	P	.012	P	F	E	G	E	G	E	E
	658040	4	2	38	8	100	N	.012	P	G	E	E	E	E	E	E
CMT	230-02408	6	4	12	12	72	N	.008	P	E	E	E	E	E	E	E
CRAFTSMAN	Excalibur Elite 32608	1	10	16	6	54	P	.015	Not Req'd.	G	E	G	E	E	E	E
DELTA	35-535	5	2	20	4	58	P	.018	No	G	E	G	E	E	E	G
	35-560	5	2	21	3	58	P	.017	No	F	E	G	E	G	E	F
FORREST	Dado King	6	4	12	12	72	N	.010	No	E	E	E	E	E	E	E
FREUD	SD208	5	2	6	6	34	N	.008	S	G	G	G	E	E	E	G
	SD308	5	2	20	4	58	P	.020	No	F	E	G	E	G	E	G
	SD508	6	4	12	12	72	N	.006	S	E	E	E	E	E	E	E
	SD608	5	4	12	12	68	N	.010	Not Req'd.	F	E	G	E	G	E	E
JESADA	108-240	6	4	12	12	72	N	.010	P	E	E	E	E	E	E	E
SYSTIMATIC	1740	5	2	20	2	54	P	.008	M	F	E	G	E	E	E	E
	1755	5	6	36	6	114	P	.010	M	F	E	E	E	E	E	E

NOTES:

1. Radial distance from tip of bevel tooth on outside blade to top of raker tooth on outside blade. This will be the depth of the tiny V in each corner of the cut. If you use the dado set for cutting box joints, the lower this number the better.
2. (M) Magnetic shims marked with thickness. (P) Plastic shims color-coded for thickness. (S) Steel shims not marked with thickness. (No) No shims included.
3. E Excellent, G Good, F Fair, P Poor

If you prefer a blade with faster and easier feed, consider the Systimatic 1740. This blade did everything well except cross-grain cuts in oak plywood.

• ***Under $150:***

The bargain in this test turned out to be the Freud SD208. At about $90, it performed on a par with blades costing $50 to $60 more. It has a trouble-free, black-anodized finish.

Written by Bill Krier Product testing: Bob McFarlin Photographs: William Hopkins Illustrations: Kim Downing

PREMIUM-PRICED 8" DADO SETS MAKE THE CUT

	RADIAL-ARM SAW PERFORMANCE (3)													ACCURACY OF CUT WIDTH WITHOUT USING SHIMS (4)						
	WITHOUT ZERO-CLEARANCE INSERT					PULLING THROUGH CUT				PUSHING THROUGH CUT										
	CROSS-GRAIN OAK PLYWOOD	CROSS-GRAIN SOLID OAK	CROSS-GRAIN PINE	MELAMINE-COATED PARTICLEBOARD	CROSS-GRAIN OAK PLYWOOD	CROSS-GRAIN SOLID OAK	CROSS-GRAIN PINE	MELAMINE-COATED PARTICLEBOARD	CROSS-GRAIN OAK PLYWOOD	CROSS-GRAIN SOLID OAK	CROSS-GRAIN PINE	MELAMINE-COATED PARTICLEBOARD	FLATNESS OF BOTTOM OF CUT (3)	1/4" CUT	1/2" CUT	3/4" CUT	WEIGHT OF FULL SET (POUNDS)	COUNTRY OF MANUFACTURE (5)	SELLING PRICE (6)	COMMENTS
	P	G	G	G	E	E	E	E	P	G	G	G	G	+.015	+.015	+.025	4.52	IS	$150	Fast feed rate, but chips plywood in crosscuts.
	P	E	E	E	E	E	E	E	P	E	E	E	G	+.012	+.012	+.025	4.67	IS	235	High-quality set, but it shouldn't chip plywood in crosscuts considering its price.
	E	E	E	E	E	E	E	E	G	G	G	G	G	+.007	+.010	+.002	5.67	IT	180	Excellent cuts with tablesaw. Includes a 3/32" chipper. Slow feed rate. Identical to Jesada set.
	P	G	E	G	G	G	G	G	P	F	F	F	F	No shims used with this product			5.04	US	200	Complicated and difficult to set up. Other sets this expensive cut better.
	P	G	G	G	G	E	E	G	P	G	G	F	F	+.017	+.030	+.065	4.15	NZ	95	Good results considering the price. Chips plywood in crosscuts. Fast feed rate.
	P	G	G	F	F	G	G	G	P	F	F	P	G	+.005	+.010	+.015	4.30	CA	155	Doesn't perform well considering its price.
	E	E	E	E	E	E	E	E	E	E	E	E	G	.000	.000	-.005	5.74	US	290*	The top set in the test. Slow feed rate.
	F	G	E	G	G	G	G	G	F	G	F	G	E	-.010	-.010	-.005	5.42	IT	90	Best value under $150. Slow feed rate.
	P	G	G	F	G	G	G	G	P	F	F	P	G	+.005	+.015	+.020	5.56	IT	125	Two test sets showed excessive micro-chips on teeth. Glue applied at factory does not hold shims to outer blades. Fast feed rate.
	E	E	E	E	E	E	E	E	E	E	E	E	G	+.003	+.007	+.013	8.65	IT	180	Excellent results in all materials. Includes a 3/32" chipper. Slow feed rate. Best overall results in sets under $200.
	P	G	G	E	G	G	G	G	G	G	G	G	G	+.002	+.010	+.013	8.54	IT	225	Easy to adjust because it's shimless. Excessive plastic coating on blades requires cleaning. Two test sets showed excessive micro-chips on teeth.
	E	E	E	E	E	E	E	E	G	G	G	G	G	+.005	-.005	-.010	5.65	IT	180	Excellent cuts with tablesaw. Includes a 3/32" chipper. Slow feed rate. Identical to CMT set.
	P	G	E	E	E	E	E	E	G	G	G	G	G	+.010	+.005	+.005	5.11	US	160	Fast feed rate, but chips plywood in crosscuts.
	P	E	E	E	E	E	E	E	G	G	G	G	G	+.025	+.015	+.015	8.63	US	270	Medium feed rate. Excellent results in tablesaw except for chipping in plywood crosscuts.

4. Measured in inches. Outside blade and chippers were assembled for the listed widths with no shimming.

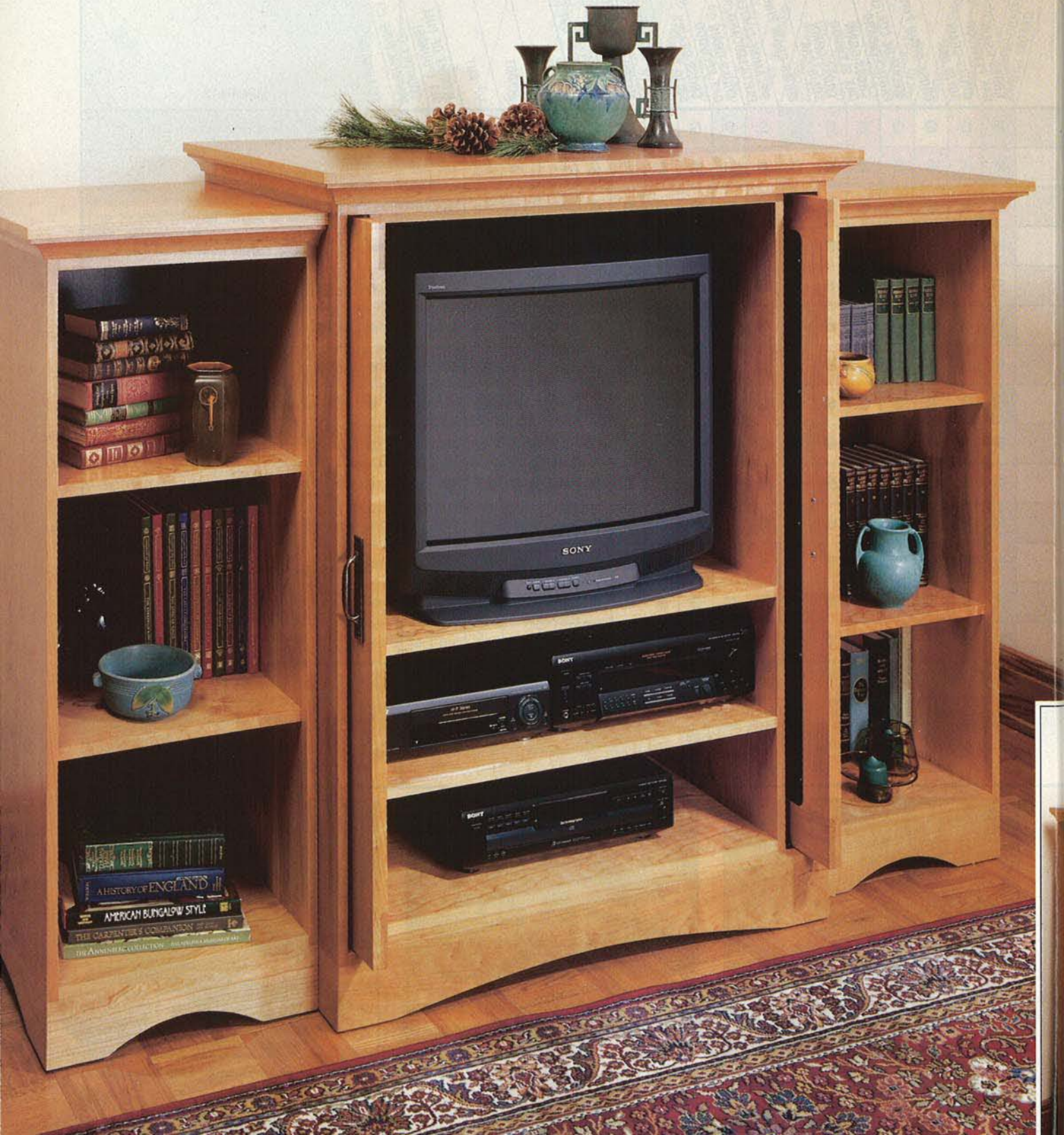
5. (CA) Canada
(IS) Israel
(IT) Italy
(NZ) New Zealand
(US) United States

6. Based on mail-order prices at time of article's production.
(*) Includes $45 sharpening coupon.

WHERE TO CALL FOR MORE INFORMATION:

Amana 800/445-0077
Craftsman Call or visit your local Sears store
Forrest 800/733-7111
Jesada 800/531-5559
CMT 888/268-2487
Delta 800/438-2486
Freud 800/472-7307
Systimatic 800/426-0000

Entertainment Extravaganza



A handsome storage system for your home electronics, and a whole lot more

Print this article

Give your CD sound system, TV, and VCR a fitting home with this three-piece cabinet combination. The main attraction, the center cabinet, offers room for a 27" television. Flipper doors pull out from the interior and neatly hide the screen when not in use. Optional matching side cabinets abound with room for practically everything else.

Begin your project-building with the carcase

1 Cut the sides (A), bottom (B), and top (C) to size from ¾" cherry plywood. Or, for a less expensive alternative, stain birch plywood (we prefer a gel stain) to look like cherry.

2 Cut the rabbets in the sides (A) and bottom (B) and top (C) and grooves in the top (C) where indicated on the drawing *below*.

3 Glue and screw the carcase (A, B, C) together, checking for square. Remove excess glue.

4 Measure the rabbeted opening, and cut the back (D) to size. Drill the mounting holes through the back side of the back panel and into the rabbet in the carcase.

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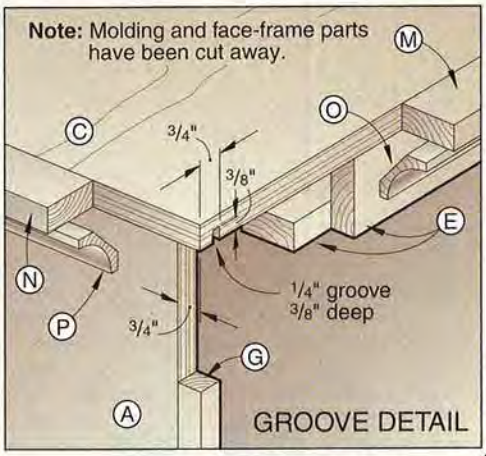
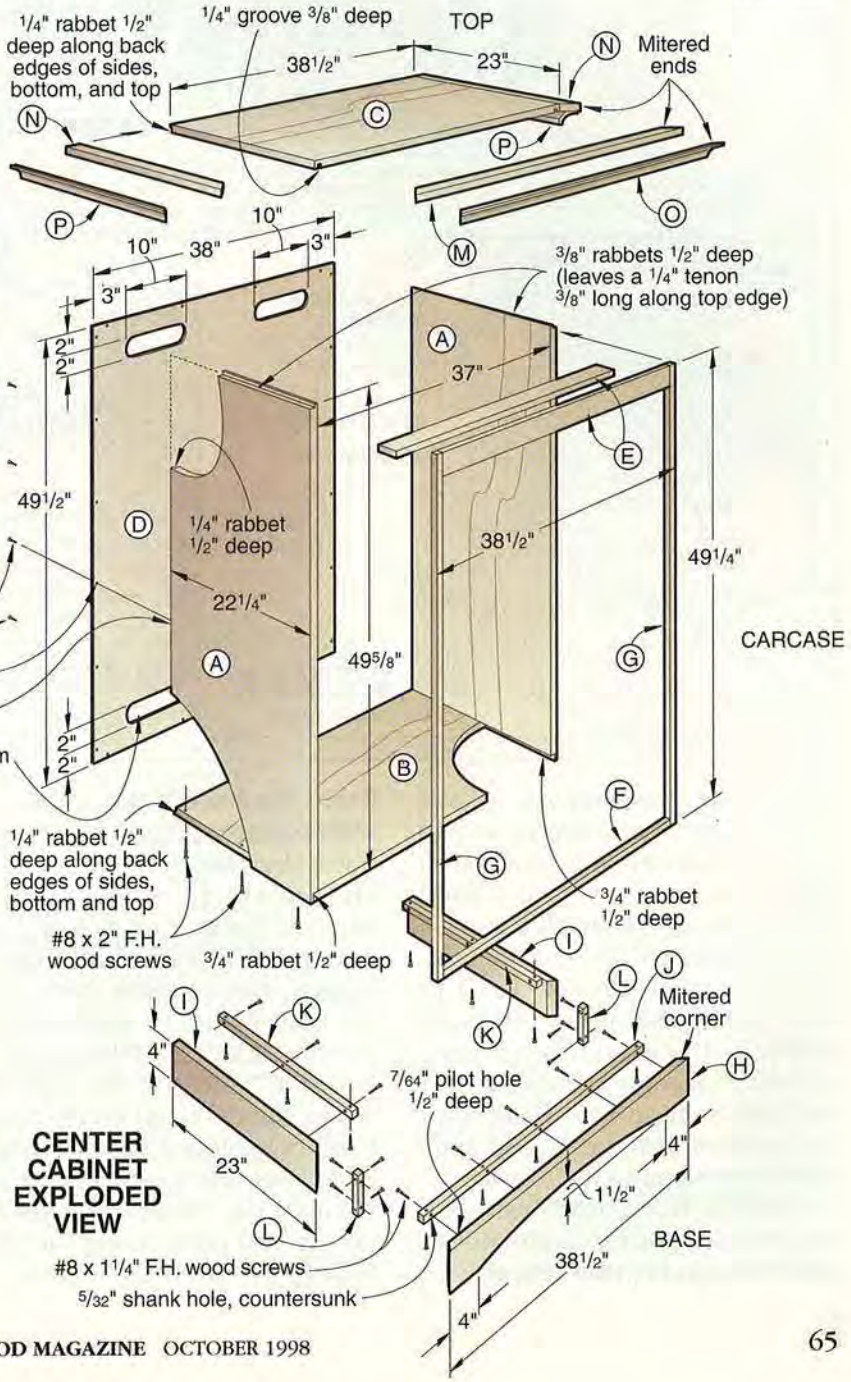
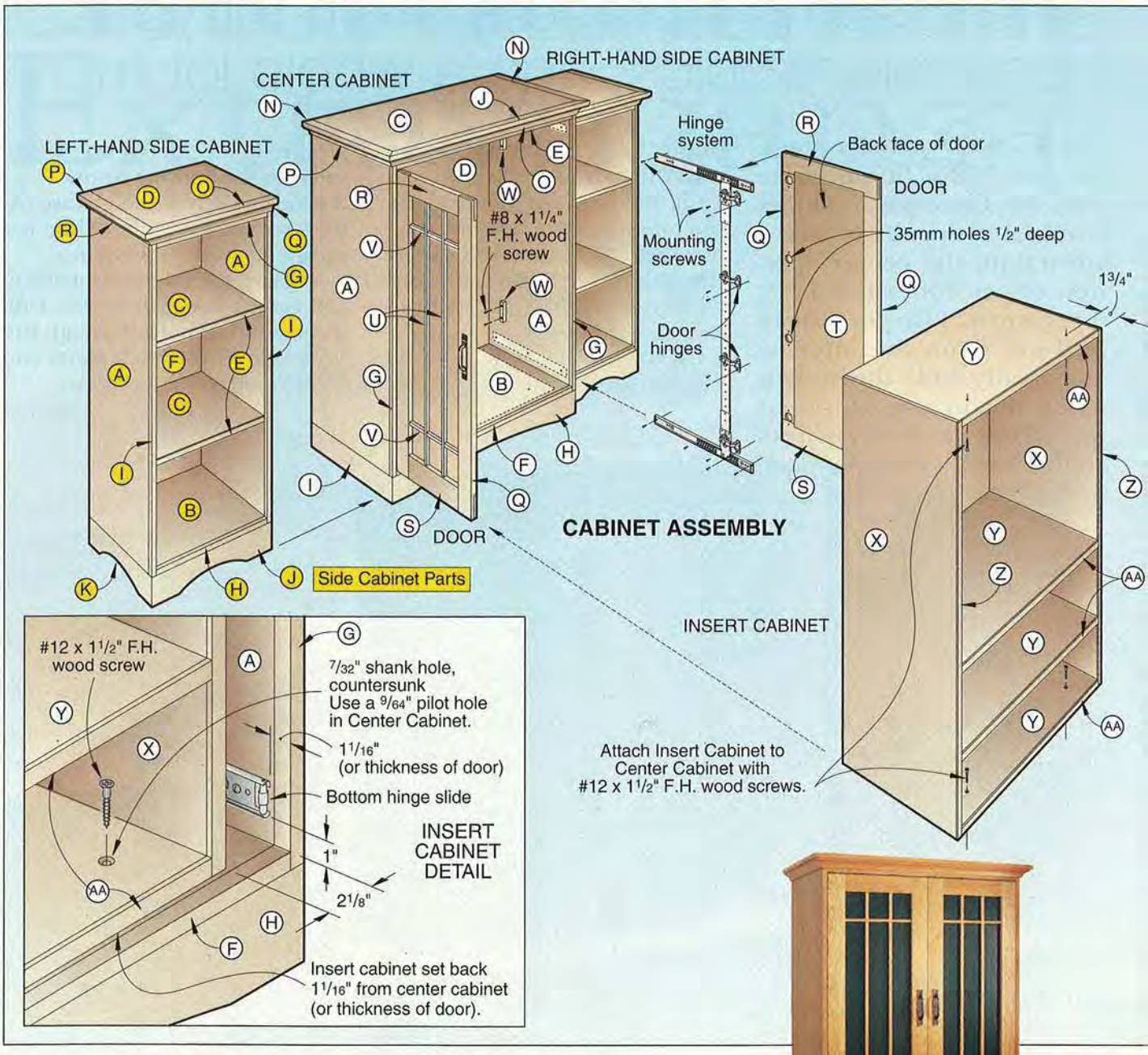




Entertainment Extravaganza


RIGHT-HAND SIDE CABINET
CENTER CABINET
LEFT-HAND SIDE CABINET
Hinge system
Back face of door
DOOR
#8 x 1¼" F.H. wood screw
Mounting screws
35mm holes ½" deep
1¾"
Door hinges
CABINET ASSEMBLY
Side Cabinet Parts
INSERT CABINET
#12 x 1½" F.H. wood screw
7/32" shank hole, countersunk
Use a 9/64" pilot hole in Center Cabinet.
1 1/16" (or thickness of door)
Bottom hinge slide
INSERT CABINET DETAIL
1"
2⅛"
Insert cabinet set back 1 1/16" from center cabinet (or thickness of door).
Attach Insert Cabinet to Center Cabinet with #12 x 1½" F.H. wood screws.

5 Mark the oval openings on the back (D) and cut them to shape. The openings provide ventilation and wire access. Set the back panel aside, you'll attach it later.

6 From solid cherry, cut the face-frame rails and stiles (E, F, G) to size, cutting the pieces the exact width of the thickness of your plywood. Keeping the edges of the face-frame pieces flush with the surfaces of the plywood, glue and clamp them to the carcase.

7 Sand the face frame flush with the plywood, being careful not to sand through the thin veneer.

Build the base flush with cabinet exterior

1 Cut the base front (H), sides (I), and cleats (J, K, L) to size. Measure the carcase before miter-cutting the front and sides to length. The outside surfaces of the base should be flush with the outside surfaces of the carcase.

2 Cut a radius in the front (H) where dimensioned on the Center Cabinet Exploded View drawing.

3 Drill countersunk pilot holes through the cleats. (We did this on our drill press, using the fence to keep the holes centered.)

4 Tip the carcase upside down. Then, glue and screw the base pieces to the bottom of the carcase. Check that the miter joints pull tight.

Cover the plywood edges with banding and molding

1 Cut the carcase top banding (M, N) to fit around the plywood top (C). Glue the pieces in place.

Continued

Center Cabinet Bill of Materials

Part	Finished Size* T	W	L	Matl.	Qty.
CENTER CABINET CARCASE					
A sides	¾"	22¼"	49⅝"	CP	2
B bottom	¾"	22¼"	38"	CP	1
C top	¾"	23"	38½"	CP	1
D back	¼"	38"	49½"	BP	1
FACE FRAME					
E top rail & cleat	¾"	2¼"	37"	C	2
F btm. rail	¾"	¾"	37"	C	1
G stiles	¾"	¾"	49¼"	C	2
BASE					
H front	¾"	4"	38½"	C	1
I sides	¾"	4"	23"	C	2
J cleat	¾"	¾"	35½"	C	1
K cleats	¾"	¾"	21½"	C	2
L cleats	¾"	¾"	4"	C	2
TOP					
M front	¾"	1¾"	42"	C	1
N sides	¾"	1¾"	24¾"	C	2
O* cove front	¾"	2⅛"	41½"	C	1
P* cove sides	¾"	2⅛"	24½"	C	2

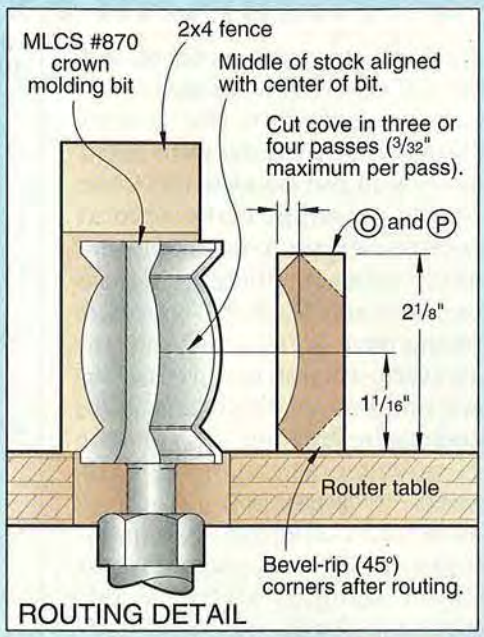
Part	Finished Size T	W	L	Matl.	Qty.
DOORS					
Q stiles	1 1/16"	3"	46"	C	4
R top rails	1 1/16"	3"	18 5/16"	C	2
S btm. rails	1 1/16"	3½"	18 5/16"	C	2
T panels	¼"	13 1/16"	40¼"	BP	2
U muntins	½"	½"	39½"	C	4
V muntins	½"	½"	12 5/16"	C	4
W door stops	¾"	¾"	5"	C	4
INSERT CABINET					
X sides	¾"	20"	46 3/16"	CP	2
Y shelves	¾"	20"	31¾"	CP	4
Z banding	¼"	¾"	46 3/16"	C	2
AA banding	¼"	¾"	31¼"	C	4

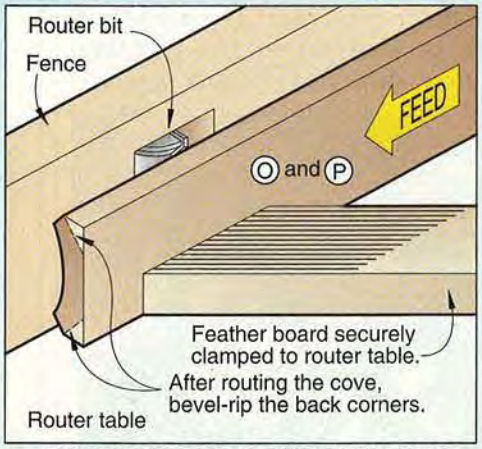
*Initially cut parts marked with an * oversized. Trim to finished size according to the how-to instructions.

Materials Key: CP–cherry plywood, BP–birch plywood, C–cherry

Supplies: #6×½" flathead wood screws, #6×¾" flathead wood screws, #8×1¼" flathead wood screws, #8×2" flathead wood screws, #12×1½" flathead wood screws, primer, paint, clear finish.

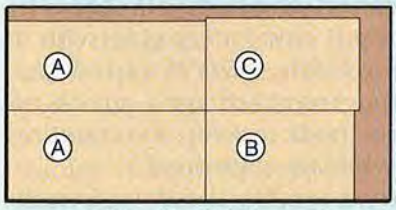
Buying Guide: Hardware. Heavy-duty flipper-door system: slides, catalog no. 89822, $43.99 each (2 needed). Overlay carrier strip and hinges, catalog no. 90239, $32.99 each (2 needed). The Woodworkers' Store, 4365 Willow Drive, Medina, MN 55340. To order call 800/279-4441.


MLCS #870 crown molding bit
2x4 fence
Middle of stock aligned with center of bit.
Cut cove in three or four passes (3/32" maximum per pass).
O and P
2 1/8"
1 1/16"
Router table
Bevel-rip (45°) corners after routing.
ROUTING DETAIL

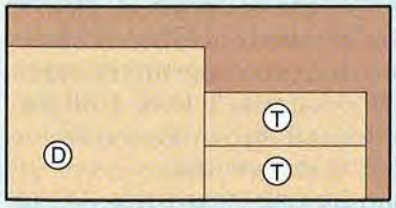


ROUTING THE COVE MOLDING

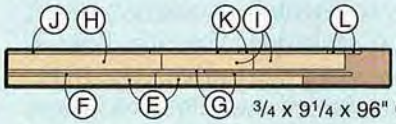
CENTER CABINET CUTTING DIAGRAM



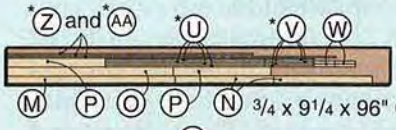
¾ x 48 x 96" Cherry plywood



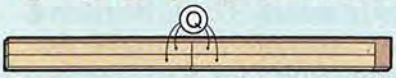
¼ x 48 x 96" Birch plywood



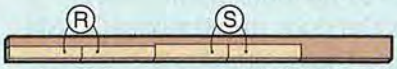
¾ x 9¼ x 96" Cherry



¾ x 9¼ x 96" Cherry



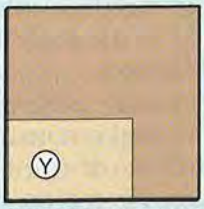
1 1/16 x 7¼ x 96" Cherry



1 1/16 x 5½ x 96" Cherry

¾ x 48 x 96" Cherry plywood

*Plane or resaw to the thickness listed in the Bill of Materials.



¾ x 48 x 48" Cherry plywood

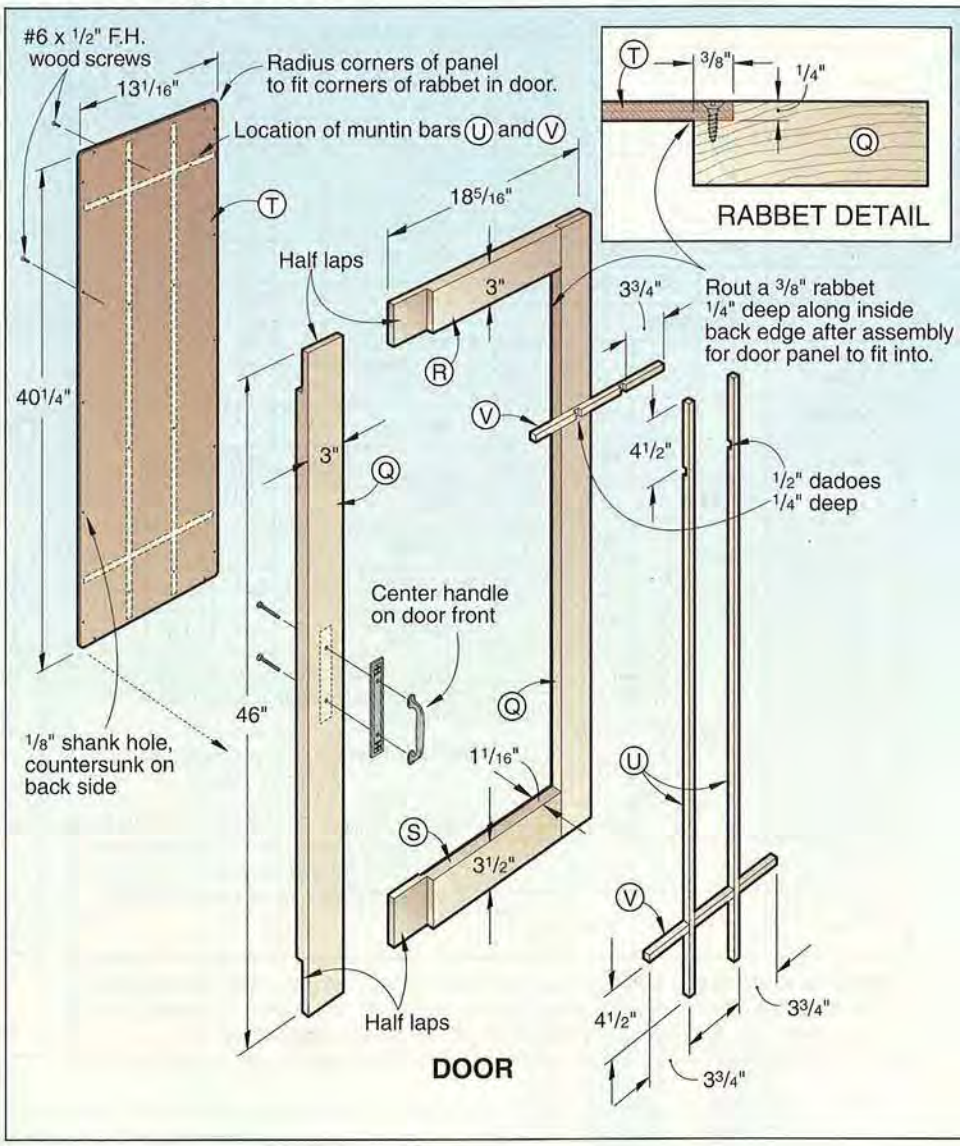
2 To form the cove molding, cut the front cove (O) and sides (P) to the sizes listed in the Bill of Materials plus 2" in length. Then, as shown in the Routing the Cove Molding drawing, make several passes to rout the cove along one surface of each piece of stock. (We used an MLCS #870 crown molding bit.)

3 Bevel-rip the back edges of the cove molding at 45° where indicated on the drawing.

4 Next, miter-cut the pieces to fit around the carcase top.

5 Glue and clamp the cove molding pieces (O, P) in place. (To do this, we clamped a cleat to the carcase top. Then, we used a 1¼"-diameter dowel and another set of clamps to pull the cove molding tight as shown in *photo A below.*)

Use a dowel and clamp block when clamping the cove molding to the top of the cabinet.



Construct a pair of half-lapped doors

1 Cut the door stiles (Q) and rails (R, S) to the sizes listed in the Bill of Materials.

2 Fit your tablesaw with a dado blade, and cut mating half laps on the ends of the stiles and rails where shown on the Door drawing. (We test-cut scrap pieces first to verify the depth of cut before cutting the stiles and rails.)

3 Glue and clamp the door stiles and rails together, measuring diagonally to check for square.

4 Sand each door smooth. Rout a ⅜" rabbet ¼" deep along the back inside edge of each door to house the door panel (T).

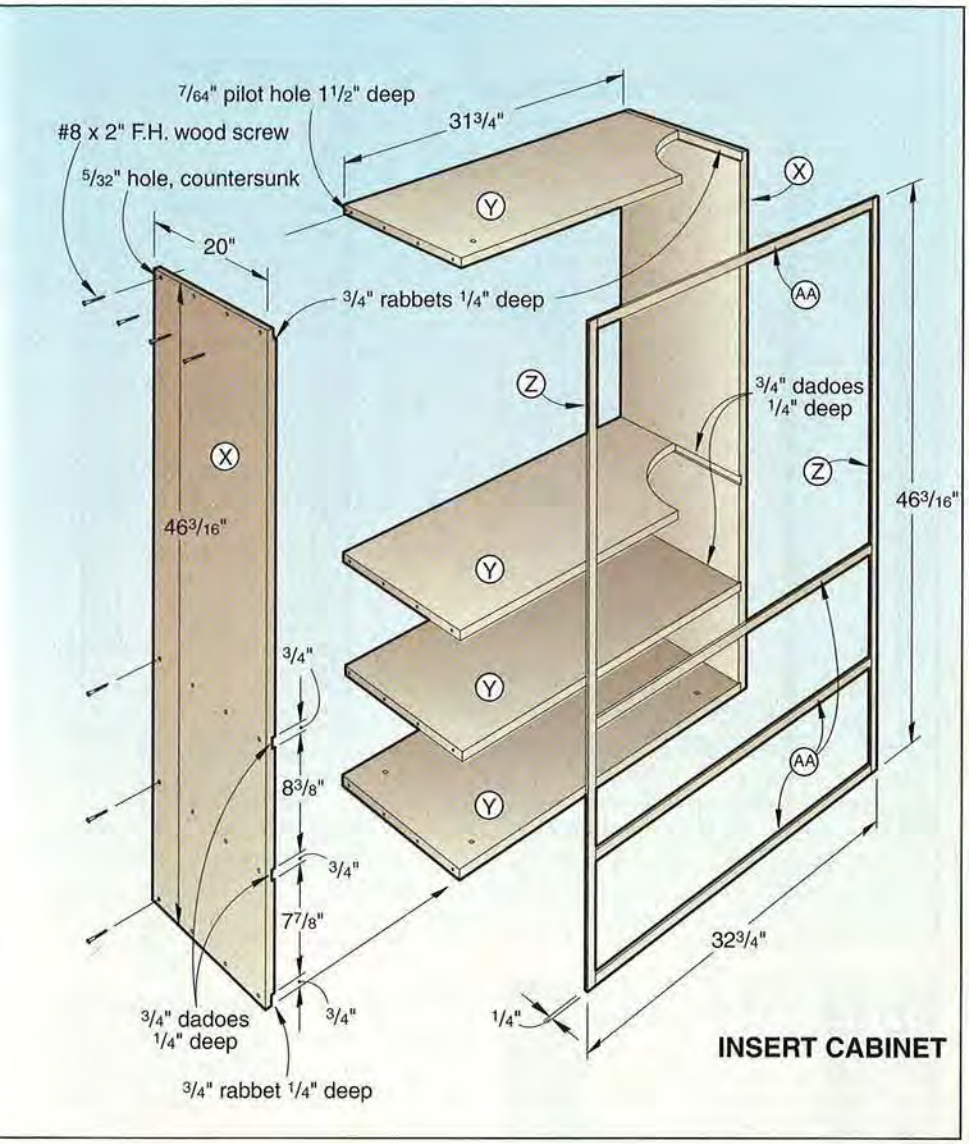
5 Cut the door panels (T) to fit the openings. Round the corners of the panels to match the round-routed corners. Then, mark the hole centerpoints and drill the mounting holes for screwing the panels to the door frames later.

6 Cut the door muntin bars (U, V) to size. Using the dimensions on the Door drawing, mark and cut the dadoes on the muntins. (We did this on our tablesaw.)

7 Glue and clamp the muntins together, checking for square. Wipe off any excess glue with a damp cloth. (We clamped the pieces together on a piece of sheet goods to keep the muntins flat while the glue dried.)

8 Dry-assemble the door frames with the back panels (T) in place. Position the muntins (U, V) in place, and mark the hole centerpoints for screwing the muntins to the door panels later. Drill the countersunk mounting holes for attaching the muntins.

9 Cut the four door stops (W) to size and screw them to the inside face of the cabinet where shown on the Section View drawing.



Construct the TV insert to fit inside the center cabinet

1 Cut the insert cabinet sides (X) and shelves (Y) to size from cherry plywood. Cut the front banding (Z, AA) to size from solid stock. The insert not only supports your electronics but also hides the flipper-door hardware.

2 Mark and cut the dadoes and rabbets where shown on the Insert Cabinet drawing *above*. For ease in access, finish the cabinet pieces now. Then, glue and screw the insert cabinet together, checking for square. Next, glue and clamp the cherry banding to the front of the insert cabinet. Sand the pieces flush.

Apply the finish before adding the flipper-door hardware

Note: *Because installing the slide hardware requires precision and takes some time, you'll want to install it only once. For those reasons, finish the cabinet now.*

1 Finish-sand the cabinet.

2 Paint the back (D) and door panels (T).

3 Screw the door panels in place, then screw the muntins to the panels.

Now, install the flipper-door hardware

Note: *The hardware system comes with an installation instruction manual. We've added several how-to photos and instructions to clarify some of the steps.*

1 Cut two spacers, one measuring 1×1×21" long and the other the thickness of your door by 12" long. As shown in *photo B*, use the 21" spacer to position the bottom slide 1" above the bottom of the carcase. Then, use the 12" spacer to position the slide the exact thickness of your door (ours measured 1 1/16") from the front edge of the cabinet. See the Section View drawing for dimensioning particulars.

Use spacers to position the bottom slide where dimensioned on the Section View drawing.

2 Drill the pilot holes and screw the bottom slide in place. Repeat for the other side of the cabinet.

3 Attach the top slide and hinge carrier to the bottom slide. Then, using the hinge carrier to hold the top slide parallel to the bottom slide, screw the top slide in place as shown in *photo C on the next page*. Again, use the 12" spacer to position the top slide the thickness of your door from the front of the cabinet.

4 Cut a scrap piece of stock the same size as one of the door stiles (Q). You'll use this in *step 6*.

5 Mount your hinge base plates to the hinge carrier, working from the center of the hinge carrier out. See the Section View drawing for reference. Position

Continued

Locate the top slide's position in the cabinet, drill the mounting holes, and screw the slide in place.

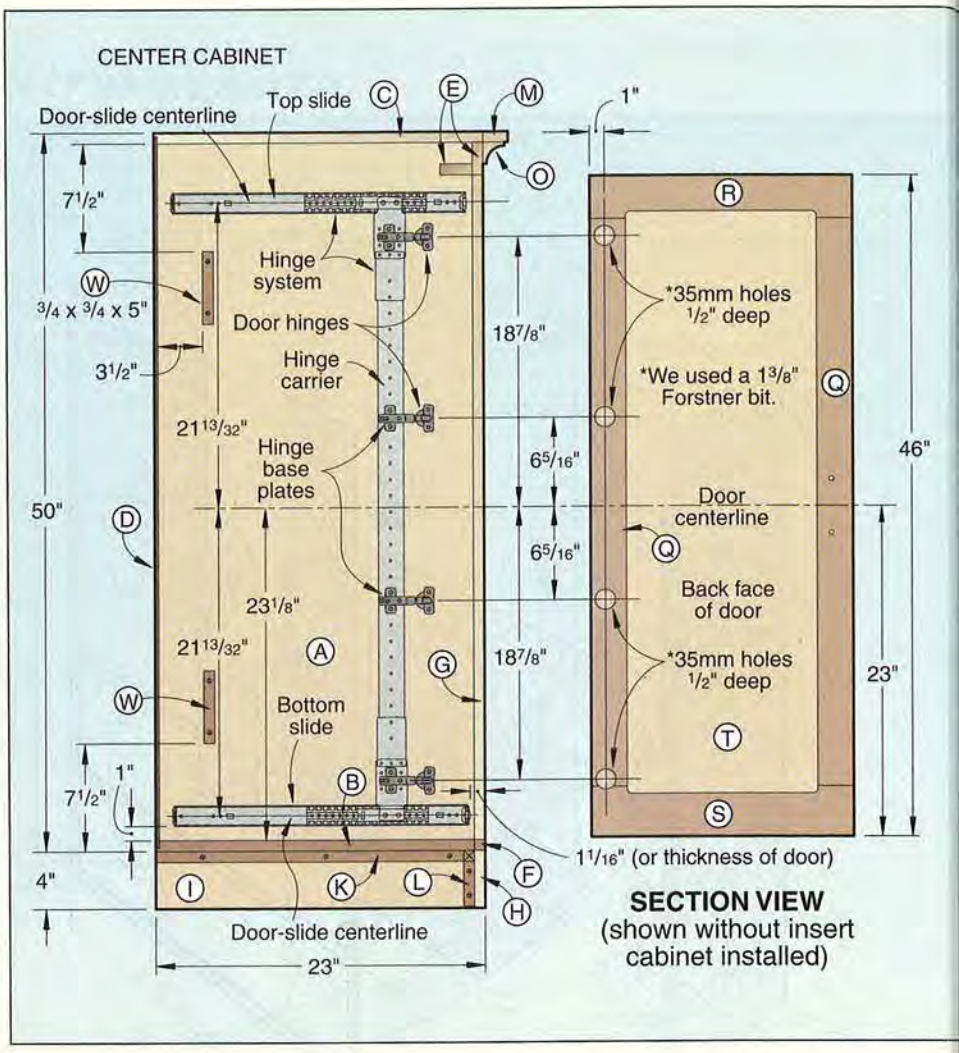
the scrap stile along the edge of the hinge carrier. Then, place a ⅛" spacer between the scrap stile and carcase. This will provide an even reveal at the top and bottom of the door frame later. Clamp the scrap stile in place. Use a square to mark the center of each hinge onto the scrap stile as shown in *photo D.*

6 *Do not drill the holes in the doors until you've verified the locations in the scrap stock.* To do this, fit your drill press with a fence and 1⅜" Forstner bit (same size as 35mm bit). Drill the hinge holes 1" from the back edge of the scrap stile.

7 Mount the hinges to your scrap stile. Attach the four hinges to the base plates attached to the hinge carrier. As stated in the hinge instructions, adjust the hinges as necessary for an even reveal between the edge of the stile and the carcase side. (We found it easier to adjust the hinge locations on the scrap stile than to do this on the assembled doors.) Once adjusted, unsnap the hinges from the hinge plates. Repeat for the other hinge assembly.

8 Install the cable blocks and then the cable system.

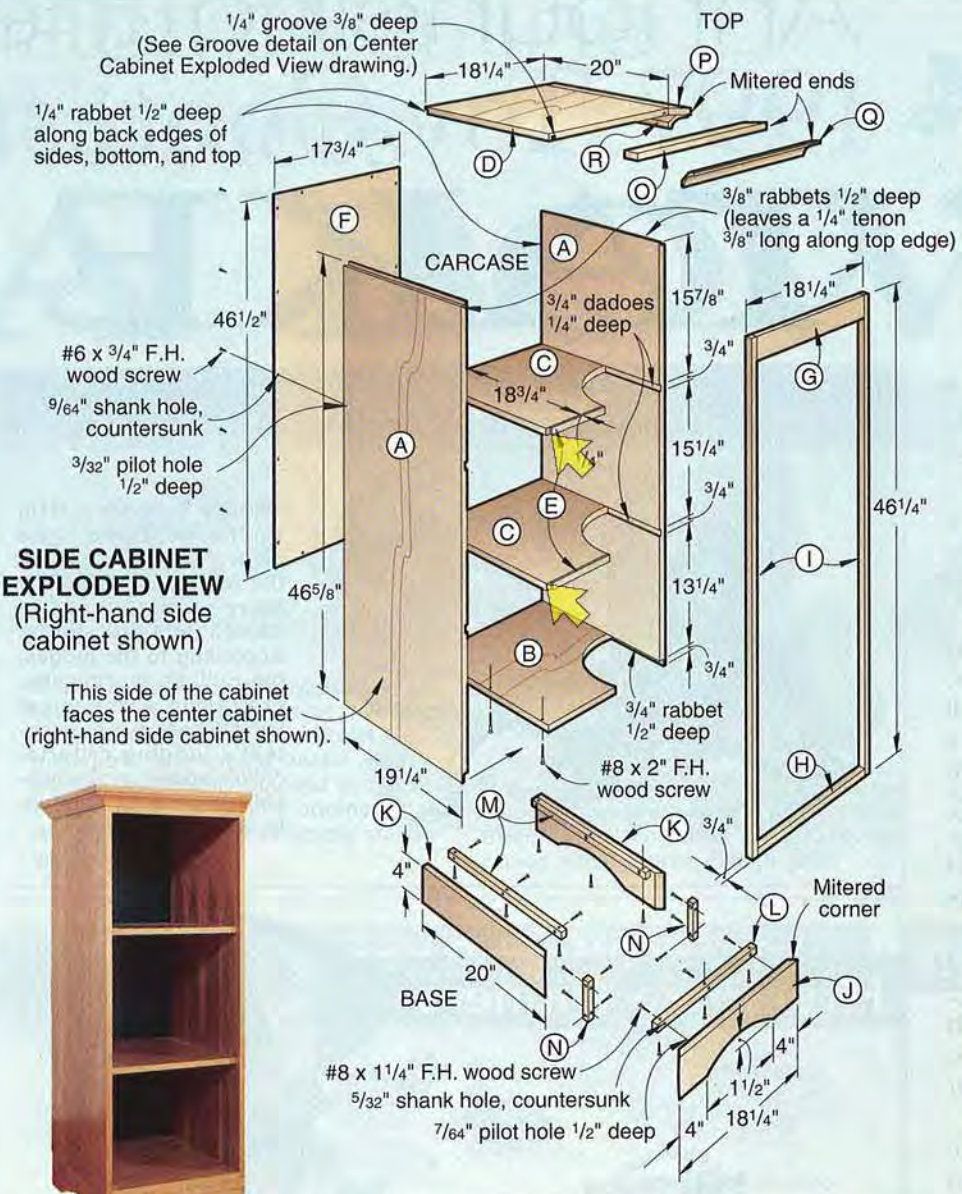
9 Use a square to carefully transfer the hole locations from the scrap stile to the doors. Bore the holes where marked. Remove the hinges one at a time from the scrap stile, and insert them into the 1⅜" holes in the door in the same sequence. Once you have the hinges in place, reattach the hinges to the hinge base plates. Double-check for proper alignment. Repeat for the other door.



Transfer the hinge hole centerpoints to scrap stile, and drill the holes to verify hole locations before drilling the holes in the door stiles.

Make the side cabinets for ample storage

1 Build the side cabinets using the same construction procedures used to construct the center cabinet. See the Side Cabinets Bill of Materials and Cutting Diagram for part sizes. Review the Side Cabinet Exploded View drawing for further reference. Note that the side-cabinet molding which butts the center cabinet is cut at a 90° angle for a flush fit against the center cabinet.



SIDE CABINET EXPLODED VIEW
(Right-hand side cabinet shown)

Left-hand cabinet

Side Cabinets Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
SIDE CABINET CARCASES					
A sides	3/4"	19 1/4"	46 5/8"	CP	4
B bottoms	3/4"	19 1/4"	17 3/4"	CP	2
C shelves	3/4"	18 3/4"	17 3/4"	CP	4
D tops	3/4"	20"	18 1/4"	CP	2
E banding	1/4"	3/4"	17 1/4"	C	4
F backs	1/4"	17 3/4"	46 1/2"	BP	2
FACE FRAMES					
G top rails	3/4"	2 1/4"	16 3/4"	C	2
H btm. rails	3/4"	3/4"	16 3/4"	C	2
I stiles	3/4"	3/4"	46 1/4"	C	4
BASES					
J fronts	3/4"	4"	18 1/4"	C	2
K sides	3/4"	4"	20"	C	4
L cleats	3/4"	3/4"	15 1/4"	C	2
M cleats	3/4"	3/4"	18 1/2"	C	4
N cleats	3/4"	3/4"	4"	C	4
TOPS					
O fronts	3/4"	1 3/4"	20"	C	2
P sides	3/4"	1 3/4"	21 3/4"	C	2
Q cove fronts	3/4"	2 1/8"	19 3/4"	C	2
R cove sides	3/4"	2 1/8"	21 1/2"	C	2

Materials Key: CP–cherry plywood, BP–birch plywood, C–cherry

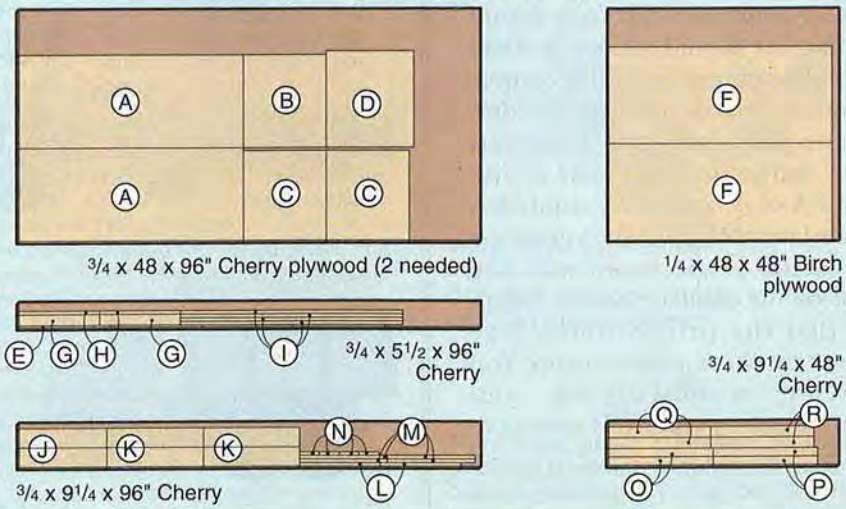
Finish, assemble, and add your components

1 Finish-sand the side cabinets, and apply the finish.

2 Paint the side cabinet backs (F), and screw them in place.

3 Position the side cabinets against the center cabinet. If a gap exists between the cabinets, drill mounting holes through the side cabinet sides (A) and into but not through the center cabinet sides (A). Position the holes so the screws won't be highly visible. Use wood screws to pull the cabinets tight to each other, eliminating the gap.

SIDE CABINETS CUTTING DIAGRAM
(enough for two cabinets)



Written by Marlen Kemmet Project Design: James R. Downing Illustrations: Kim Downing Photographs: Hopkins Associates; Hetherington Studio

Announcing the 1997 Toy Contest TAKE

Who can help but marvel at a wonderful wooden toy? Certainly that was the case with our judges for *WOOD*® magazine's 1997 Build-A-Toy contest. For nearly a day, they picked up, examined, tinkered with, and yes, even played with the year's entries.

There were the usual assortment of cars, trucks, cradles, puzzles, rocking horses, pull toys, and doll furniture. Many were carefully thought out and skillfully executed. Some approached perfection. A few were appealingly folksy. But all toys were truly great because they reflected the efforts of readers to help make a needy child happy at Christmas. And they did, because all entries were auctioned last November, with the proceeds going to the U.S. Marine Corps Reserve's Toys for Tots program.

Since its inception in 1989, the Build-A-Toy contest has raised nearly $85,000 to benefit underprivileged children during the holidays through Toys for Tots. The *WOOD* magazine staff feels proud of that. So should all our readers who have entered and the companies that have donated prizes during the past nine years. However, 1997 marks the final year of the Build-A-Toy contest. Instead, we're launching a new version—the Build-A-Gift™ contest! See *page 66* for details. So here's hoping that the prizewinning toys shown on these pages inspire you in your woodworking, and prompt you to enter our new contest.

Print this article

Best Toy Entry

George Schnare's farm truck captured the judges' hearts, votes, and the top place—Best Toy Entry—with its prize of $3,000 in Delta tools. According to the judges, the Hull, Massachusetts, craftsman's whimsical vehicle best met the contest's judging criteria: child's appeal, craftsmanship, originality, durability, safety, and finish.

First Prize Winners

Dee E. Cook took First Prize, professional, and $2,000 in DeWalt tools. The Lawrenceville, Illinois, reader's jack-in-the-box barn camper and truck was as intriguing as it was well built and neatly completed with a fine finish.

First Prize, home hobbyist, went to David Gooding, a Garden Prairie, Illinois, woodworker. His unique fish-in-a-bucket game brought him $2,300 in Craftsman stationary machines.

First Prize, junior craftsman, was won by Chris Reising, Des Moines, Iowa. His effort in the maple dump truck was rewarded with $1,000 in Skil power tools.

last of a line

Winners A BOW!

Grand Prize Winners

Grand Prize, home hobbyist, was captured by Bill Jorritsma of Yucaipa, California. His Caterpillar Model 637-E push/pull, twin-engine tractor scraper was so realistically detailed you could almost hear the mighty engines roar. His prize was $2,500 in Grizzly stationary power tools.

Robert C. Benson, Tyler, Texas, won the Grand Prize, professional, of $2,500 in Bosch portable power tools with his carved rabbit rocking chair in pine.

Grand Prize, junior craftsman, was awarded to Elton G. Eby, of London, Kentucky. His well-crafted fire truck with extension ladder and hose earned him a $1,400 RBI Hawk Ultra scrollsaw.

Second Prize Winners

Home hobbyist Jim Christian of Vancouver, Washington, walked away with Second Prize in his division and $750 in Skil tools for this amusing take-apart jalopy of a car.

Ryan Augustine of Bloomington, Minnesota, took Second Prize, junior craftsman, and $750 in Dremel tools with a fish, rabbit, and bird featuring interchangeable heads.

Second Prize, professional, was claimed by Howard Clements, Knox, Pennsylvania. His model land/sea/air rover of clear-finished maple and walnut won him a $1,050 Milwaukee sliding compound mitersaw.

Third Prize Winners

Jack Dalton, Jackson, South Carolina, won Third Prize, home hobbyist, and $500 in Dremel tools with a three-wheeled motorcycle.

Third Prize, professional, and $500 in Porter-Cable tools went to George F. Campbell, Philpot, Kentucky, for building this P-40 Mustang fighter.

Third Prize, junior craftsman, and $500 in Meisel Hardware merchandise went to Joseph Reising, a young Des Moines, Iowa, reader, with his mini sports car.

Citation and special award winners

Best use of wood. Jack Dalton, Jackson, South Carolina; $300 Campbell Hausfeld HVLP spray system.

Best model. Bill Jorritsma, Yucaipa, California; $185 in clamps from American Tool Company.

Best pull toy. William E. Fischer, Norfolk, Virginia; $300 in various MLCS woodworking products.

Best clear finish. Dee E. Cook, Lawrenceville, Illinois; $250 in Formby's finishing supplies.

Best painted, dyed finish. William E. Fischer, Norfolk, Virginia; $250 in Formby's finishing supplies.

Best educational toy. Howard L. Clements, Knox, Pennsylvania; $250 in Constantine's merchandise.

Best transportation toy. Art Bartelme, Fort Pierce, Florida; $399 Vicmarc mini lathe from Craft Supplies USA.

Best action toy. Ronald D. Carter, Geff, Illinois; $170 in bits and clamps from American Tool.

Best entry/shop class. Mechanicsburg Area Intermediate School, Mechanicsburg, Pennsylvania; $250 in Delta tools, $1,000 in 3M supplies, $375 in clamps and saws from American Tool, $250 in Klockit merchandise.

Photographs: Hetherington Photography

GLASSES

Wood stems give

Many turners love making ornamental goblets. Here's a new spin on them that combines a turned stem with a glass bowl. They're not only pretty and practical, they're fast and fun to make, too.

Project prep

Stock: 3×3" turning square approximately 4–6" long, depending on pattern, any species.

Lathe equipment: Chuck or 3–4" faceplate, 60° cone revolving tail center.

Tools: ¾" roughing gouge, ¼" and ½" spindle gouge, ¾" skew, parting tool.

Lathe speeds: Roughing, 500–800 rpm; turning, 1200–1500 rpm; sanding, 800–1200 rpm.

First, break some glasses

Before turning the wooden bases, buy some inexpensive glassware and break the bowls off the stems. Starting with the glass allows you to size the hole in the turned piece to fit it. (We paid $1–$5 each for a variety of stemmed wine and cocktail glasses, including some acrylic ones, at a decorative-imports store.) Here's how to break the bowl from the stem without bloodshed. Wear eye protection throughout, of course.

1 With a small triangular file, scratch a mark on the glass stem about ⅜" below the bottom of the bowl, as shown *opposite page, photo A.*

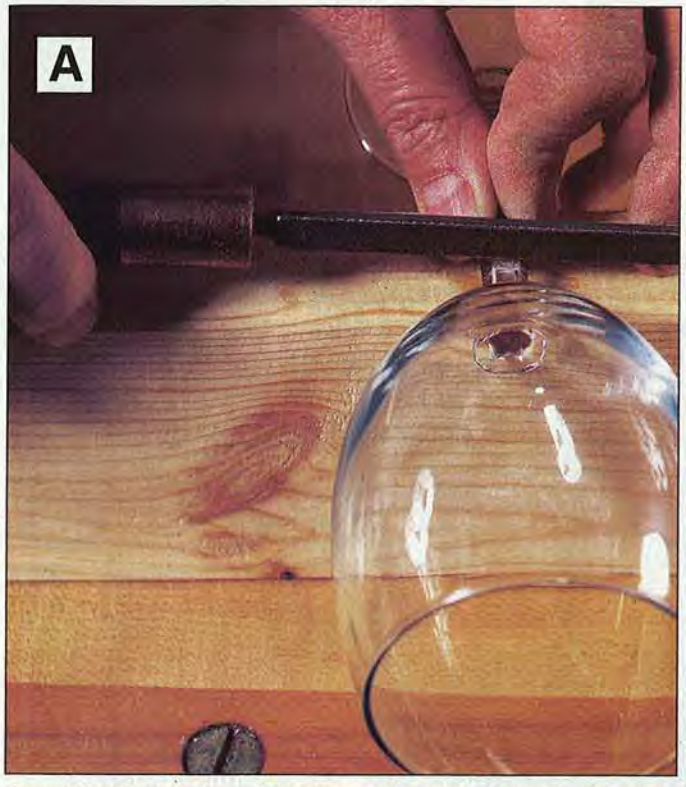
2 File a nick all around the stem at the mark. It only needs to be deep enough to scratch the surface. Or, you could grind around the stem with a fine, sharp-edged abrasive stone in a handheld rotary tool. Wear a dust mask if you do this.

3 Drape a towel or shop rag around the glass. Then, holding the glass by the bowl and the stem, place your thumb behind the nick as shown *opposite page, photo B,* and gently snap the stem at the nick. A sharp rap with the file handle will break it, too.

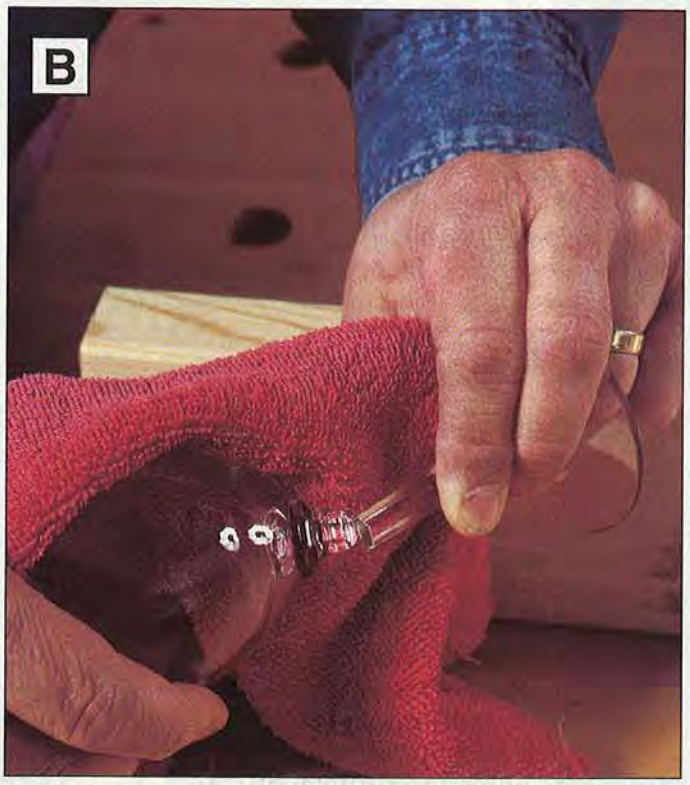
4. If you have acrylic stemware, saw through the stem with a coping saw or a fine-toothed backsaw.

Print this article

with a turner's touch
special sparkle to glassware



Score the glass stem all around with a file. Support the stem with a scrapwood block.



A sharp rap along the scored line or a quick snap breaks off the stem cleanly.

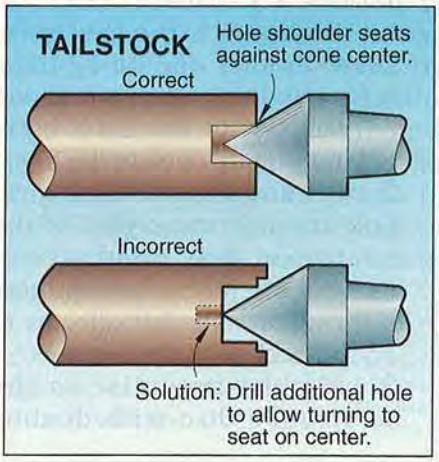
Then, turn bases for them

1 Locate the center on each end of a piece of 3×3" stock of the length shown for the base you're turning. (See the Full-Size Half-Patterns in the *WOOD PATTERNS*® insert in the middle of the magazine.) For a design of your own, make the blank about 1½" longer than the turning's finished length.

2 Measure the diameter and length of the stem stub on your glass. Bore a hole of that diameter and depth in one end of the blank. Use a drill press, and clamp the blank to a vertical fence to ensure a true hole.

A few of our glasses fit neatly into a straight ⅜" hole. But decorative beads or fillets where the stem joined the bowl on other glasses dictated counterboring or tapering the hole in some blanks. A handheld rotary tool and carving bits proved useful for fitting bowls to holes. The half-patterns show several hole configurations we used.

3 Mount the blank between centers, supporting the bored end with a 60° cone center in the tailstock. The shoulder of the hole should seat against the cone, as shown in the Tailstock drawing. Round the blank down to its largest diameter.


TAILSTOCK
Hole shoulder seats against cone center.
Correct
Incorrect
Solution: Drill additional hole to allow turning to seat on center.

4 Mark the overall length of the stem turning on the rounded blank, measuring from the tailstock end. With a parting tool, cut in to about 1" diameter on the headstock side of the mark. Form a tenon at the headstock end to fit into your lathe chuck. If you don't have a chuck, turn a 1" tenon 1" long at the headstock end of the blank. Dismount the workpiece.

5 Mount your chuck on the headstock, and grip the blank in it. Bring up the tailstock and cone center to center the turning.

If you don't have a chuck, attach a piece of scrapwood about 1½" thick to a 3-4" faceplate. Mount the assembly on the lathe, then round the edge and true the face. Bore a ⅞" hole 1⅛" deep in the center. Carefully enlarge the hole until the tenon on the blank fits snugly into it. Press the tenon into the hole,

Continued.

then bring up the tailstock to center the workpiece.

6 Referring to the half-pattern for the design you've chosen, mark locations of the turning's major features on the blank. With the parting tool, cut into the workpiece at each point, establishing a diameter of the dimension shown plus 1/16".

7 Employing spindle gouges and a skew chisel, turn the blank to rough shape, with the diameters about 1/16" oversize. Then, make a final light cut, preferably with freshly sharpened tools, to bring the stem to finished dimensions.

It's nearly time for a toast

1 Sand the turning with progressively finer grits from 100 to 320. After sanding the rotating turning with each grit, shut off the lathe, and sand with the grain to minimize cross-grain scratching.

2 Part off the turning at the bottom of the base. Cut in with the parting tool, aiming the tool slightly toward the tailstock to form a concave base. (This helps the turning sit without rocking.)

3 Apply a finish of your choice. We sprayed gloss polyurethane varnish on our bases, except one. That one received a dark red crackle finish, using a kit purchased from a craft-supplies shop. Mask the hole when applying the finish.

4 Glue the glass bowl into the stem hole with slow-setting epoxy adhesive (it's waterproof). To align the glass bowl, place the assembled stemmed base and bowl on a level surface, stand back, and sight across the top of the glass to another known level surface in your shop. View it from several sides.

Form the glue squeeze-out into a bead or fillet around the base of the glass. Wipe away the excess.

5 In use, hand-wash and dry the glasses, holding the top downward to keep hot, soapy water from running down the outside into the glued joint. Wipe the base and stem with a damp cloth.

Here's a method for making a wooden base and stem like the one shown above without using a lathe or turning tools. Start by breaking a glass, as described earlier.

Saw and sand the base

1 Draw a 3"-diameter circle on 1/2"-thick stock for the base. Draw another one on 3/4"-thick scrapwood to make a workholder. Bandsaw or scrollsaw both, staying slightly outside the line.

2 Drill and countersink a 3/8" hole through the center of the scrapwood disc. Insert a 3/8×2" flathead machine screw through the countersunk face. Secure it on the back with double nuts.

3 Affix the base disc to the scrapwood disc with double-faced tape, putting the tape on the side that will be the bottom of the base. Chuck the assembly in your drill press.

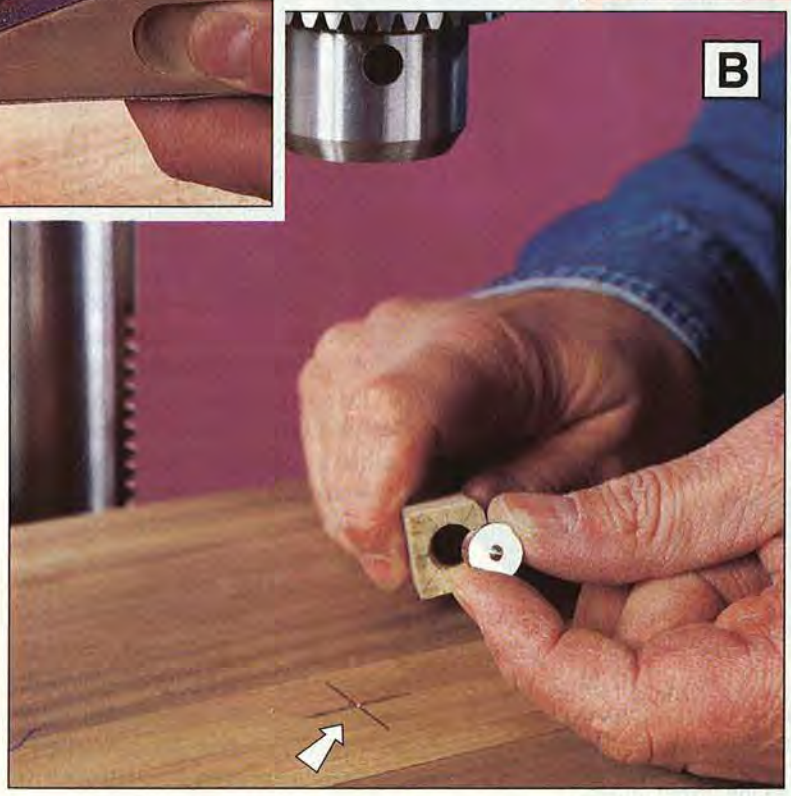
4 With the drill press running, sand the edge of the discs true and round, using a hand sanding block or a sanding disc chucked in a portable drill. Then, sand the face to the pattern contour, as shown in *photo A*. Finish-sand with progressively finer grits from 100 to 320. Mark the center of the base by holding a pencil against the center of the spinning disc.

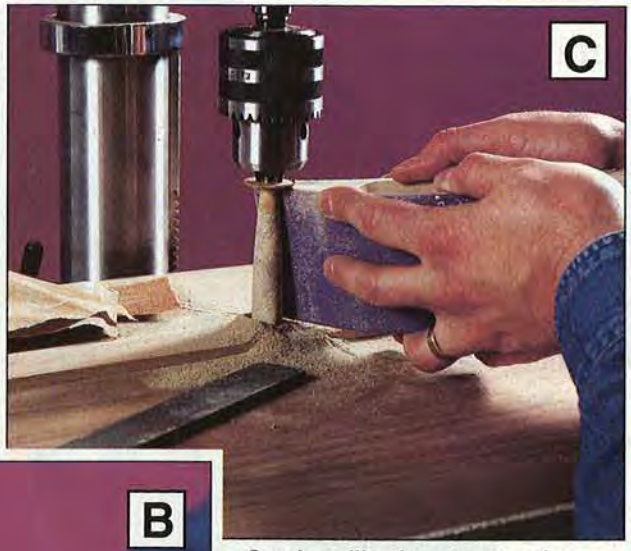
Shape and sand the stem

1 For the stem, mark the center on each end of a 3/4×3/4×2 3/4" piece of stock. With your drill press, bore a 3/8" or 1/2" hole (depending on the stem diameter of your glass) 1/2" deep in the end that will be the top of the stem. Push a dowel center into the hole, as shown in *photo B*. The center will serve as a bearing when shaping the stem.

After trueing the edge, sand the face of the base to shape. A disc sander chucked in a portable drill would do the job, too.

A dowel center serves as the lower bearing for sanding the stem. The point fits into the hole indicated by the arrow.





Sand or file the stem to shape. Chamfer the corners of the blank first to make the job go faster.

2 Clamp a piece of hardwood scrapwood (maple or birch would be a good choice) to the drill-press table. Chuck a 1/16" bit in the drill press, and drill a hole about 1/4" deep into this auxiliary table.

3 Change to a 1/4" bit in the drill press. Stand the stem blank on the auxiliary table, the point of the dowel center in the hole. Drill 3/8" deep into the center of the blank. Drill to the same depth in the center of the base.

4 Glue a 1 1/2" length of 1/4" dowel rod into the hole in the stem.

5 Using knives, planes, or other tools, cut away the corners of the stem blank, and roughly taper it.

6 Cut a 1" disc from 1/8" hardboard, and drill a 1/4" hole through the center. Slide the hardboard washer over the dowel, then chuck the dowel in the drill press. Extend the drill-press quill to engage the dowel center's point in the auxiliary-table hole. Lock the quill.

7 With the drill press running at a low to medium speed, sand the stem to shape, as shown in *photo C*. Contour it initially with coarse sandpaper, then follow up with progressively finer grits for finish-sanding.

8 Remove the hardboard washer, and trim the dowel to 5/16" long. Glue the dowel into the hole in the base. (We used moisture-resistant woodworker's glue.) Ensure that the stem stands straight.

9 Allow the glue to cure, then apply a durable clear finish. Glue the glass bowl into the stem, as described under the heading "It's nearly time for a toast."

Project concept: Mark Reschke
Turnings by Rus Hurt; Larry Johnston
Photographs: Marty Baldwin; Hetherington Photography
Illustrations: Roxanne LeMoine; Lorna Johnson

Popular Playthings

Throughout history, woodworkers have played a major role in toy production. Here are some of their wooden marvels that live on today.

Historians disagree about when the first "toys" appeared. Primitive peoples, say authorities such as Richard O'Brien (*The Story of American Toys*, Abbeville Press, 1990), had little time to create playthings for their children. A dried gourd served as a rattle to amuse a baby. A child-size bow allowed a boy to learn the hunter's ways.

Archaeologists, though, attest to the fact that as societies grew more civilized, toys as we think of them became more prevalent. Most toys, such as the ones you'll read about here, began in wood.

So-called Dutch dolls of wood were exported from Holland to England, Europe, and America. Sold at prices almost everyone could afford, they could be dressed as the owner chose.

The English called them babies

Although remains of small clay figures that appear to be dolls have been excavated from Egyptian tombs of 2000 B.C., anthropologists believe them instead to be offerings to the gods. In classical Greece and Rome, however, dolls were plentiful. A most elaborate wooden doll, her body sculpted and fitted with movable limbs joined by pinned sockets, was discovered in the coffin of a young girl in Rome. It was traced to the second century B.C.

Little is known about dolls or toys in England and France before the 15th century. Then, trade with Germany introduced a number of wooden toys, dolls among them. By Queen Elizabeth's reign in the 1550s, dolls, or "babies" as people called them, were so popular that Sir Walter Raleigh brought many with him on his explorations to the New World as gifts for the natives of Virginia.

In the 18th century, English dolls—with carved wooden heads and lathe-turned bodies—became the most attractive ever made. These babies were carefully dressed in current fashions.

As the 1800s came, a new type of doll appeared in England. Shown *left*, it was referred to as the Dutch doll because Holland was its primary origin. With a carved wooden head, simply painted features, and jointed body, the Dutch doll was sold in a variety of sizes at reasonable prices for the next 100 years.

Little houses not meant to be touched

Dollhouses as we know them—with roofs, windows, doors, and walls—first appeared in the homes of the English and European wealthy during the late 1600s. Furnished with handmade furniture, silk draperies, and even silver candlesticks, they reflected in miniature the status of their owners, and were usually not meant to be played with.

In the 1800s, dollhouses made especially for children were more commonplace, see photo *opposite top*. They ranged from simple two-room structures destined for tabletops to massive—and costly—showplaces. One dating to Queen Victoria's time in the 1870s measures over 9' long, stands 5'2" tall, and has 12 rooms more than 2' deep. It was made, however, for two brothers, who filled its drawing room with squads of toy soldiers!

France goes crazy over a child's game

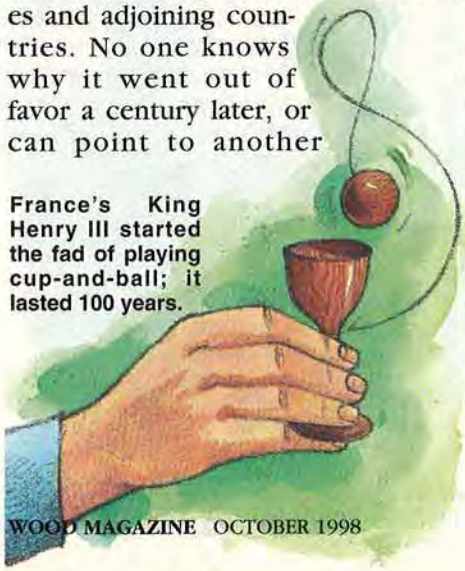
The Renaissance in Europe inspired men and women to all sorts of endeavors, even games. In

from the Past

Dollhouses date back to the 1500s. This one is an 1835 Greek Revival style built for Albertina Shelton Taylor of New York City and called the Shelton Taylor Baby House.

France, a fad for a childish game of skill called *bibloquet* mesmerized the nation for 100 years.

It seems that in 1585, King Henry III developed a passion for this game, which amounted to catching a round wooden ball in a turned, goblet-type cup to which it was attached with a string, *below.* Cup-and-ball took off like a rumor among the ladies and men of court, then spread to the masses and adjoining countries. No one knows why it went out of favor a century later, or can point to another activity that replaced it, but toyshops still carry modern versions of this once immensely popular toy.



France's King Henry III started the fad of playing cup-and-ball; it lasted 100 years.

Only the law could stop jumping jacks

Another peculiar toy frenzy swept France in the mid-1700s, one not unlike today's Tickle-Me Elmos and Beanie Babies. This was the *pantin*, or jumping jack.

The toy, such as the one *above right,* made of flat wooden sticks similar to tongue depressors, had joints at the arms and legs. By means of a string, the pantins were made to dance and jiggle. People of all classes were intrigued by this puppet, especially when the figures were painted to satirize political figures.

The pantin craze lasted about five years. The government ended it by banning the toy for fear that women would bear babies with twisted limbs like the jumping jack! The little puppet lived on in America, though, as a still well-known folk toy.

French police ended the frenzy for the pantin or jumping jack. It was banned to avoid birth defects.

Noah's ark was never meant to sail

No one knows for certain where or when the first Noah's ark appeared. But Bavaria in southern Germany, where spruce forests supplied stock for carvers and woodturners who made toys, was a likely source. By the early 1700s, the trade there became so large that 600 tons of toys were exported annually.

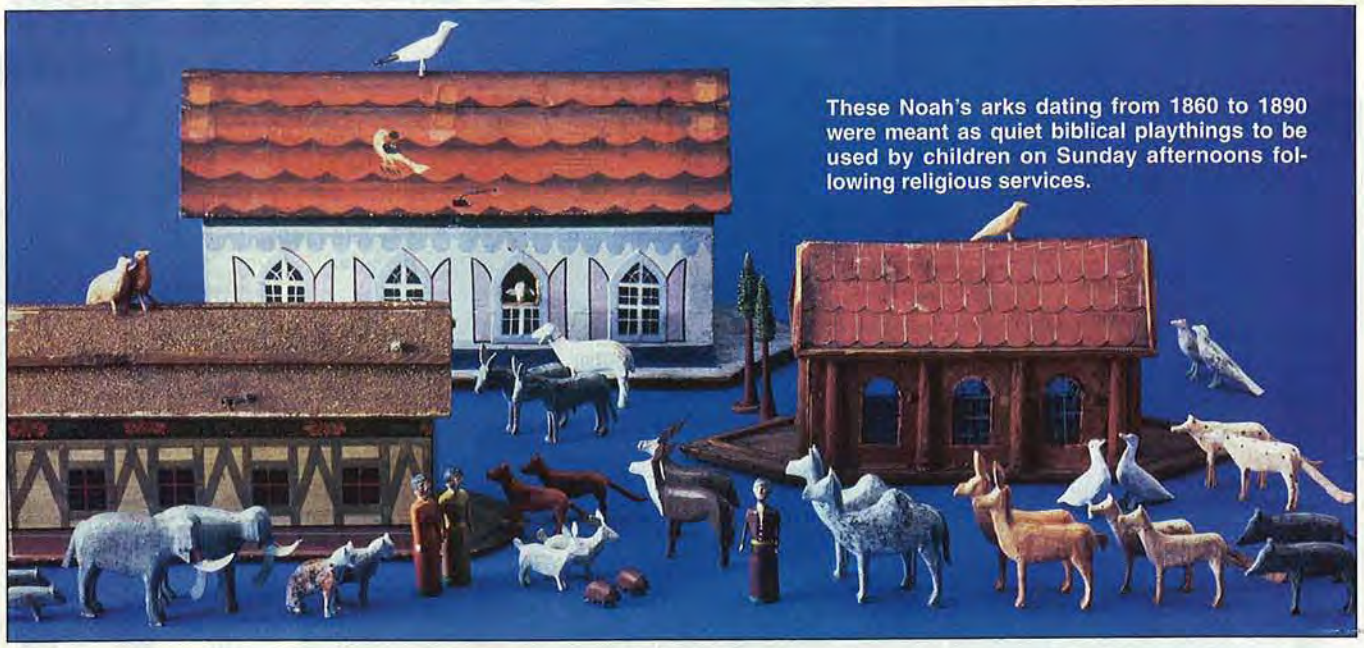
The earliest examples of Noah's arks—dating to about 1800—definitely were designed and built as land-based playthings because they had wheels. And they could be had in any size. One in the London Museum has 364 animals.

To produce the animals for Noah's arks in quantity, German woodturners used a special technique. A block of spruce was turned to a ring in the shape of an animal in cross section, then each figure was sawn away from the ring. A carver would then finish shaping the pieces, and a painter would add the colors.

Charles Dickens wrote about the wonders of a Noah's ark in his

Continued

Popular Playthings from the Past



These Noah's arks dating from 1860 to 1890 were meant as quiet biblical playthings to be used by children on Sunday afternoons following religious services.

story *Under the Christmas Tree.* But in the religiously proper time when they became popular, such toys, shown *above*, were probably reserved for Sunday playtimes following church services.

They rode steeds of stable stock

Hobbyhorses, often nothing more than a stick with a crude head, are detailed in early European paintings and woodcuts. Rocking horses also hark from medieval times. However, these were the wooden first steeds of young noblemen.

Astride them, they began learning knightly tournament and battle skills. The prototypes were nothing more than two slabs of wood joined in an A-shape atop a platform. But by the 1800s the rocking horse at its finest was delicately carved, painted, fitted with real horse-hair manes and tails, then balanced on two curved rockers. Lesser models, *below*, might still be slabs with the bodies rendered in painted outline on their flat sides.

Rocking horses were first built as crude platforms in medieval times. This painted version dates to 1890.

Tops evolved from a long history of revolution

Ancient Egyptians played with tops molded from clay. In Greece and Rome, children played with wooden tops turned on pole lathes. In Renaissance Europe, wooden tops were spun by means of whips.

In the 1800s, a skill game called diabolo was played on both sides of the Atlantic. An hourglass-shaped spool of wood was spun by the manipulation of a string tied between two sticks. Part top, part yo-yo, diabolo is said to have been very difficult to master.

Playing an 1800s skill game called diabolo required a person to use two sticks joined by string to roll a top-like wooden spool.

Written by Peter J. Stephano Illustrations: Brian Jensen Photographs: Courtesy of the Museum of the City of New York; Perry Struse

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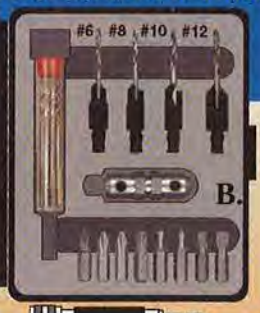

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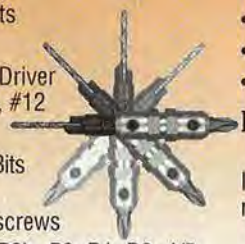

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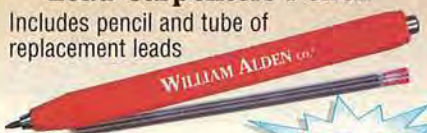

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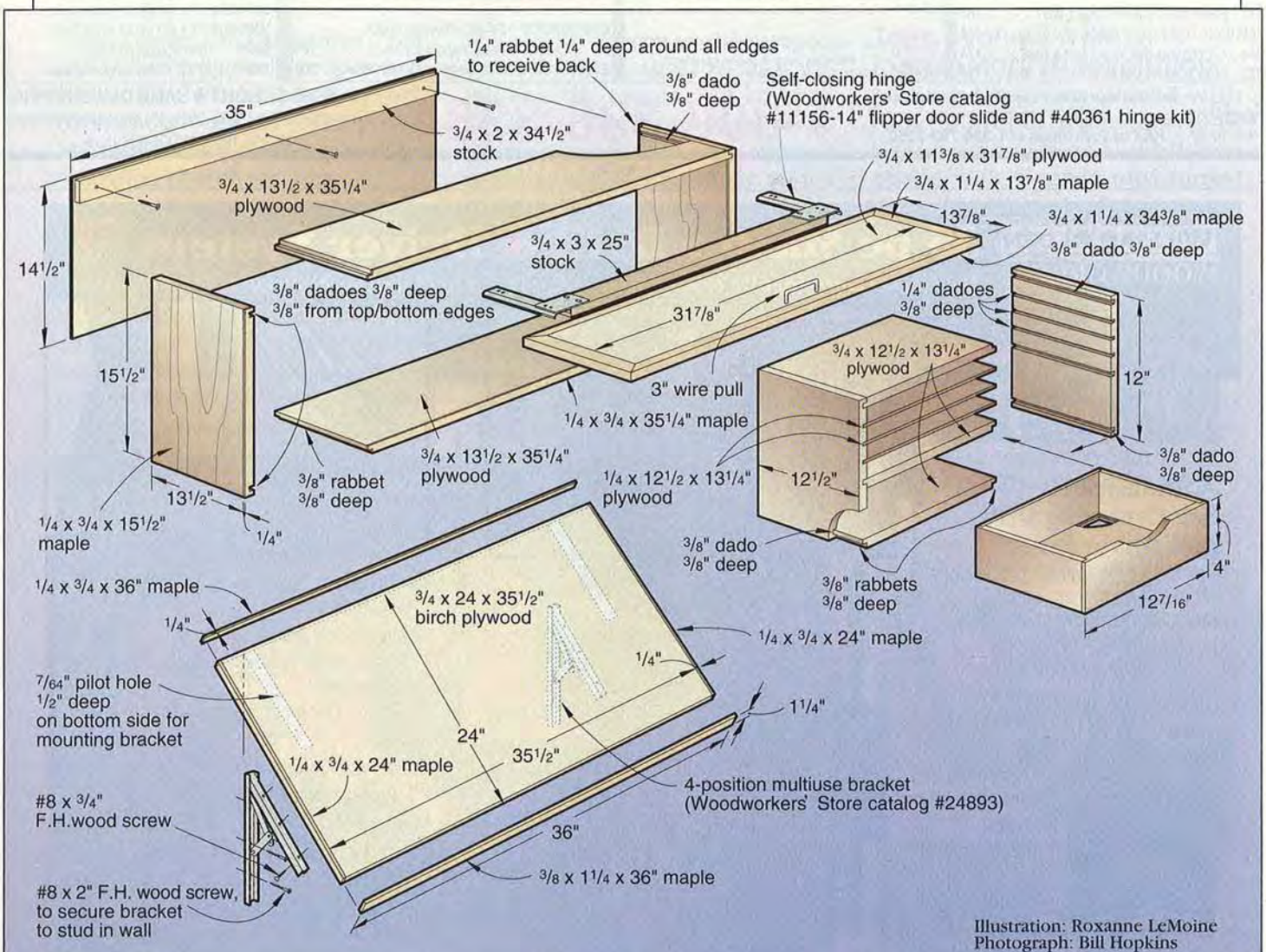
1/4" rabbet 1/4" deep around all edges to receive back
3/8" dado 3/8" deep
Self-closing hinge (Woodworkers' Store catalog #11156-14" flipper door slide and #40361 hinge kit)
35"
3/4 x 2 x 34 1/2" stock
3/4 x 11 3/8 x 31 7/8" plywood
3/4 x 1 1/4 x 13 7/8" maple
3/4 x 13 1/2 x 35 1/4" plywood
13 7/8"
3/4 x 1 1/4 x 34 3/8" maple
3/8" dado 3/8" deep
3/4 x 3 x 25" stock
14 1/2"
3/8" dadoes 3/8" deep 3/8" from top/bottom edges
1/4" dadoes 3/8" deep
31 7/8"
3/4 x 12 1/2 x 13 1/4" plywood
15 1/2"
12"
3" wire pull
1/4 x 3/4 x 35 1/4" maple
3/8" dado 3/8" deep
3/4 x 13 1/2 x 35 1/4" plywood
1/4 x 12 1/2 x 13 1/4" plywood
3/8" rabbet 3/8" deep
13 1/2"
12 1/2"
1/4 x 3/4 x 15 1/2" maple
1/4"
3/8" dado 3/8" deep
4"
3/8" rabbets 3/8" deep
12 7/16"
1/4 x 3/4 x 36" maple
1/4"
3/4 x 24 x 35 1/2" birch plywood
1/4 x 3/4 x 24" maple
1/4"
7/64" pilot hole 1/2" deep on bottom side for mounting bracket
1 1/4"
24"
1/4 x 3/4 x 24" maple
35 1/2"
4-position multiuse bracket (Woodworkers' Store catalog #24893)
#8 x 3/4" F.H.wood screw
36"
3/8 x 1 1/4 x 36" maple
#8 x 2" F.H. wood screw, to secure bracket to stud in wall

Illustration: Roxanne LeMoine
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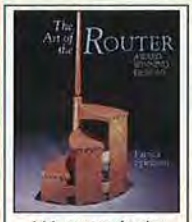

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By Patrick Spielman, *author of The Art of the Router and more than 50 other woodworking books.* How smooth is the carbide on a Jesada tool? So smooth, so precise and so highly-polished that you'll have to see it to believe it! Jesada bits and cutters were recently tested for the quality of the carbide surface's finish. The results were comparable to the finest polished glass mirrors, and that's a finish you will not find anywhere in the industry.

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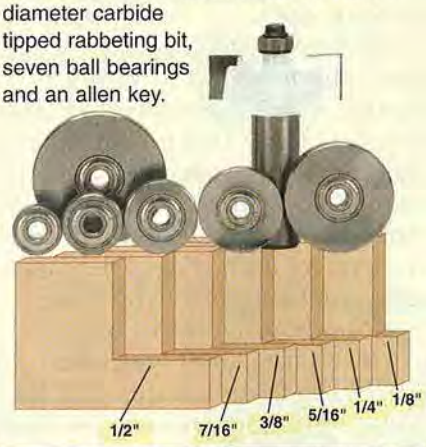
How does Jesada achieve such a superb finish? It takes a combination of the right tools, the right techniques and above all, patience. Jesada has made a huge investment in the finest grinding equipment available anywhere: the 5-axis computerized grinder. They've equipped these machines with the highest quality diamond grinding wheels. They use only a 100% oil-based coolant as opposed to the more common water-based coolants. And they take their time, lots of time!

The Rabbeting bit shown below is a great example. This bit takes about 4-1/2 minutes to grind to a mirror finish. Jesada's competitors may take as little as 45 *seconds* on a rabbeting bit. That may make their bit cheaper than Jesada's, but the difference shows up in the performance of the tool. First, a polished surface allows for a finer cutting edge, so Jesada bits cut cleaner and longer than tools with a more-coarse finish. Second, the highly polished surface sheds most of the pitch and gum that would cling to the imperfections of a coarse surface. Could Jesada grind the bit in 45 seconds? Sure, but they would never be satisfied with the results, and I don't think you would be either.

Jesada bits take up to 6 times as long to grind as our competitors' bits, but the difference shows in the performance. Of course, Jesada bits have lots of other features too!

Is a mirror finish worth all this extra effort? I'm sure that it is, but I think you should convince yourself. Why not try one of the specially-priced sets on this page.

Jesada's **Rabbet-Master Plus™ Set** would be an ideal choice. This set cuts rabbets from 1/8" to 1/2" deep & flush trims as well! The set includes an 1-3/8"-diameter carbide tipped rabbeting bit, seven ball bearings and an allen key.



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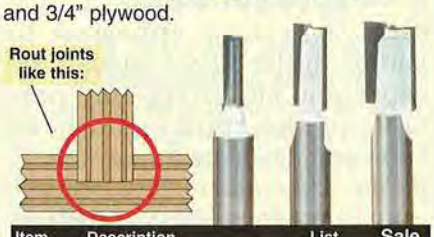

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600-625	1/2" Shank Ply-Groove Set	$65.90	**$49.90**

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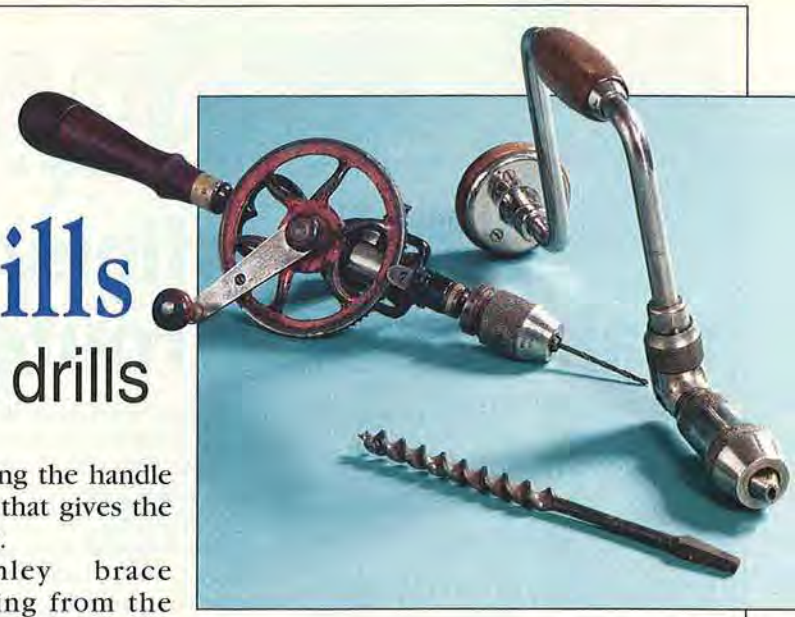
Circle No. 1335

Bit Braces and Hand Drills

The original cordless drills



Today we often rely on a portable power drill—probably a cordless one—for making holes. Not too long ago, though, home woodworkers didn't have it quite so easy. Back then, drilling a hole ¼" or smaller usually called for a hand drill and twist bit, like the one shown at left in the photo *above right*. Larger holes were the province of the brace, at right in the photo, and auger bit.

A bit about braces

Bit braces first appeared in Europe in the 1400s, though the underlying mechanics—the principle of the crank—had been known in China centuries before. By the dawn of the 20th century, the brace had evolved to the tool we recognize.

Often termed the American Pattern brace, this type differs from earlier designs in two key elements. The first, the screwed shell chuck with self-centering jaws, came along in the 1860s. The second, a ratcheting drive for the chuck, began to appear shortly thereafter.

The chuck securely grips bit shanks of different diameters, and makes changing them a snap. (Bits for braces typically feature square tapered tangs, shown in the foreground, *above right*.) The ratchet provides continuous circular motion even when the handle swings back and forth through only a portion of its sweep. This allows boring in close quarters and also improves efficiency—a user can swing the handle in the range that gives the best leverage.

The Stanley brace shown, dating from the 1940s, was ordinarily used with auger bits. But, it could also take other tooling, including twist drills with square taper tangs, countersinks, and screwdriver bits. Virtually identical braces are still manufactured today.

A high-end hand drill

The geared hand drill, an American innovation, arrived on the scene in the 1870s. It soon became standard workshop equipment, and remained so until deposed by low-priced portable electric drills.

The hand drill is a fairly simple machine to use: You turn a hand crank, which is attached to a large wheel. Gear teeth around the large wheel mesh with a pinion attached to the chuck. Typically the chuck makes about 3-5 revolutions for each spin of the crank. This provides faster bit speed—but less power—than a brace.

The hand drill excelled in drilling smaller holes, such as pilot holes for screws. (The hand drill's three-jaw chuck would grip round-shanked twist drills up to ¼", sometimes ⅜".) The high bit speed made drilling through metal easier, too.

The drill shown, a two-speed model made by Goodell-Pratt Co. of Greenfield, Massachusetts, represents the deluxe end of the hand drill range. Sears, Roebuck and Co. priced this model at $2.22 in the 1922 catalog. Other hand drills in the catalog ranged in cost from 43¢ to $1.34. (The best bit brace listed for $1.77.)

Its two speed ranges—marked fast and slow—give this drill about 4⅔ and 1⅓ chuck revolutions per crank turn. To change speeds, you pull out a spring-loaded knob (shown *below*), rotate it 180 degrees, and let it pop back in. The lower speed range comes in handy for drilling larger holes.

Rotating a pull-out knob changes speeds on the two-speed hand drill.

Photographs: Hetherington Photography
Tools courtesy of F.E. Hanson

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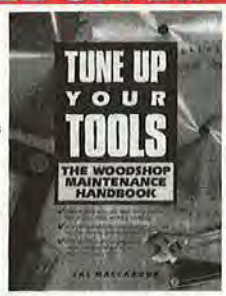

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- Ends second-step finishing
- Ends cutting 1/16" oversize to allow for RESURFACING
- **BUY AND SHARPEN 1 BLADE INSTEAD OF 3**

5/8" holes, boring thru 1-1/4" add $7.50. Larger at Time Basis —Shipping $4.50

WOODWORKER II	LIST	SALE	10%	20%
14"X40TX1"	$215	$149	$134	$119
14"X30TX1"	$195	$139	$125	$111
12"X40TX1"	$183	$129	$116	$103
12"X30TX1"	$162	$119	$107	$ 95
10"X40TX1/8" or 3/32"	$156	$119	$107	$ 95
30T 1/8" or 3/32"	$135	$ 99	$ 89	$ 79
9"X40T	$146	$109	$ 98	$ 87
30T	$125	$ 99	$ 89	$ 79
*8-1/4"X40TX 3/32"	$136	$ 99	$ 89	$ 79
8"X40T 3/32"	$136	$ 99	$ 89	$ 79
30T	$115	$ 89	$ 80	$ 71
7-1/4"X30T 3/32"	$112	$ 69	$ 62	$ 55
**6"x40T 3/32"	$136	$ 89	$ 80	$ 71

*NEW for Sears & Makita Table Saws **New For Saw Boss

$21 VALUE — **FREE 10" ORANGE PLASTIC BLADE RUNNER–CARRIER!** SHIPPED WITH 6", 8" & 10" DADO SETS. HOLDS UP TO 10 BLADES, 5 PER SIDE ON CENTER BOLT OR DADOS.

DELUXE DADO-KING!

AS LOW AS $184 NET AFTER USING SHARPENING COUPONS

WORLD'S NO. 1 DADO - NO CHIP ON PLYS & MELAMINE

C-4 Carbide Tips — 4 on each chipper with special negative face hooks. Shims & 3/32" Chipper. Cuts 1/8" to 29/32" wide!!

	LIST	SALE	10%	15%
6" D. 5/8" Bore NEW	$299	$269	$242	$229
8" D. 5/8" Bore	$321	$289	$260	$245
10" D. 5/8" & 1" Bore	$389	$349	$314	$297
12" D. 1" Bore	$499	$449	$404	$382

(Bore up to 1-1/4" Add $25 — Plus $5.50 S&H)

CUTTING PROBLEMS?

Call the factory for *FREE* technical help!!
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FLASH NEWS!!

OUR $79 - $89 30T & 40T OUTPERFORMED (E-EXCELLENT) 23 other 40T & 50T premium blades both foreign & domestic on Ply, Melamine, MDF and Oak/Rip!

CHOPMASTER FOR SLIDING COMPOUNDS & MITER SAWS

New specs, 5° Neg. Pts. & flat, runs out less than .002 for perfect, tight, smooth, splinter-free miter joints. **TAKE EXTRA 10% – 20% OFF COMBO SALE!**

NEW SIZES AVAILABLE	LIST	SALE
Delta Sidekick 6-1/2"x40Tx5/8"	$149	$ 89
Sears 8-1/4" & Delta 8-1/4"x60Tx5/8"	$170	$ 99
Hitachi 8-1/2"x60Tx5/8"	$179	$109
DeWalt 8-1/2" & Ryobi 8-1/2"x60Tx5/8"	$179	$109
Delta 9"x80Tx5/8"	$204	$119
Ryobi–Makita & all 10"x80Tx5/8"	$207	$129
DeWalt, Makita, B&D, Hitachi 12"x60Tx1"	$229	$139
Ryobi–Makita 14"x100Tx1"	$266	$179
Hitachi 15"x100Tx1"	$277	$189

For good general purpose cuts use Woodworker II 30T & 40T or Woodworker I. Use small stiffener where possible.

In Stock Blades made for Special Uses:
- Gang Saws • Panel & Scorer • Picture Frames (Miter-Master)
- Solid Surface • Thin Rim • Plastic/Acrylic (No-Melt)

Also made to order Blades available within 3 weeks, at competitive prices!

THE ONE BLADE THAT LEAVES A SMOOTH-AS-SANDED SURFACE!

SAVE ANOTHER **$45 to $90** AFTER USING SHARPENING COUPONS

WOODWORKER I – CROSSCUT — 7 1/4" – 14"

For TABLE and RADIAL SAW – 10% to 20%

NON-SPLINTERING PLYS	LIST	SALE
14"x60Tx1"	$224	$159
12"x60Tx1" or 5/8" 1/8"K	$198	$139
10"x60Tx5/8" 3/32"K	$162	$129
8-1/4"X60T	$150	$109
8"X60T	$150	$109
7-1/4"X60T	$150	$109

OTHER SIZES AVAILABLE – 7 1/4" – 14"

Editors' Choice and Top Rating over 18 competing combo saw blades!
"The 10"x40T earns our Editors' Choice award for the best performance, regardless of price. The 10"x40T produced super-smooth ripped edges in ¾ in. pine and oak, with absolutely no saw marks visible to the eye...we also got excellent crosscuts, surpassed only by an 80-tooth dedicated crosscut blade."
See *American Woodworker* April 1998, pp. 64-69.

DURALINE HI-A/T FOR TABLE & RADIAL SAWS

PORTABLE & PANEL SAWS

5/8" HOLES. Boring up to 1-1/4" $7.50 extra. Larger holes–time basis. Shipping $4.50.

TAKE 10% TO 20% MORE OFF THESE PRICES

Faster feed rates & absolute splinter control. Stops splintering on OAK/BIRCH PLY VENEERS & MELAMINE

SIZES AVAILABLE	LIST	SALE
7-1/4" x 60T x 3/32" K	$149	$129
8" x 80T x 1/8" & 3/32" K	$202	$169
220mm x 80T x 1/8" x 30mm	---	$167
9" x 80T x 1/8" & 3/32" K	$207	$179
10" x 80T x 1/8" & 3/32" K	$207	$159
12" x 80T x 1-1/8"K	$212	$181

SIZES AVAILABLE	LIST	SALE
300mm x 100T x 1/8" x 30mm	---	$197
12" x 100T x 1-1/8"K	$253	$215
14" x 80T x 1"	$232	$197
14" x 100T x 1"	$266	$226
16" x 80T x 1"	$262	$223
16" x 100T x 1"	$294	$243

Above is bore standard.

SPECIAL COMBO SALE EXTRA 10%-20% OFF

CARBIDE IS THE HARDEST OF THE C-4 GRADES AND 40% STRONGER, NOT WEAKER! FOR 50% TO 300% LONGER LIFE.

Standard C-2 Carbide (below, left) and FORREST **still sharp** Oxidation and Corrosion Resistant Sub-Micron C-4 Carbide (below, right). Each shown after cutting 3,500 feet of MDF. Similar results obtained cutting particle board, melamine, and plywood.

STILL SHARP AFTER 3,500 FEET OF CUTTING!

BLADE DAMPENERS-STIFFENERS

FOR BETTER CUTS on all brands of blades, use our large 1/8" DAMPENERS-STIFFENERS against one side.

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5"	..... $24
6"	..... $25

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REDUCES NOISE 50%–75%

WE RECOMMEND OUR FACTORY SHARPENING as some local sharpening creates problems with **MICRO-CHIPPED EDGES** reducing blade life & cutting quality.
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with two sets of blades: $499	with rip fence and mitre gauge: $569	Both left- and right-tilt XACTA saws with table and legs: $1,399	with 5 micron bag: $399	with enclosed stand and rollers: $1,199	with mortise attachment and 5-piece chisel set: $439
Save $71.91	*Save $64.48*	*Save $178*	*Save $70.93*	*Save $150*	*Save $88.48*

Easy-to-use Slip Stop limits Forstner bit depth

Forstner bits pose a problem when it comes to setting a positive stop for hole depth. You can limit drill-press quill extension, but that calls for a lot of figuring if, for instance, you want to drill same-depth holes in stock of different thicknesses. Now, the Slip Stop provides a simple, effective way to limit depth.

I found it a snap to install a Slip Stop on a bit and adjust it. First, from the several collets provided I picked the one that fit my bit shank. (Each stop comes with a blank collet, too, that you can drill to fit an odd-sized shank.) Then I slipped the stop onto the bit, slid the collet into the stop body, and screwed on the brass nut. Fine adjustments also proved easy—loosen the brass nut and move the stop up or down the shank.

A slip clutch allows the three spinning arms to stop as soon as they contact the workpiece. This prevents marring the surface, as well as letting you know you've reached the desired hole depth.

Slip Stops come in six sizes for bits from 9/16" to 2⅛". The bright yellow stops appear to be well-made from brass and high-quality plastics, and worked flawlessly in my tests. They're available individually, in a set of six, or in a kit with six stops and two quick-change hubs—the best value, in my estimation, for home-shop use.

—Tested by Larry Johnston

PRODUCT SCORECARD

Slip Stops for Forstner bits

Performance	★ ★ ★ ★ ★
Price	About $10 each; kit, about $30; set, $50, plus shipping
Value (Kit)	★ ★ ★ ★ ★

Woodworker's Supply, 1108 North Glenn Rd., Casper, WY 82601-1698, call 800/645-9292, Fax 800/853-9663.

Compact belt sander proves powerful performer in tight spots

Bosch's new 1278VS compact belt sander takes care of such a variety of sanding chores so effectively that it practically makes this most tedious operation in woodworking enjoyable.

The 1278VS sands right into corners, angles, and recesses, under or behind obstructions, and along edges. And while it reaches into all these tight spots with the ease and agility of a detail sander, it sands with the aggressiveness of a belt sander.

A key element in this kind of versatility is the 5/16"-diameter roller at the sanding head's tip. This small tip, together with the head's 40° angle, gets the 1½"-wide sanding belt into places unreachable by other belt sanders. The tip extends about 1" beyond the end of the machine. You can sand flush against one side, on either the top or bottom of the belt, and at the tip.

I found this versatile sander easy to handle, too. The 15"-long housing allows a one- or two-handed grip. An auxiliary side handle can be attached, too. The on-off switch sits conveniently on top of the housing. The speed adjustment knob is at the back.

The powerful sander can remove lots of material quickly at maximum speed. Turn to a lower setting on the infinitely variable speed control, and you can sand more delicately. In the shop, I rounded corners with a speed setting of 2½ to 3. For work outdoors on a deck railing, I turned it all the way up to 5. In all cases, I found the tool very controllable.

The belt tracks well, even under heavy pressure. Tracking adjustments are easy, with a single-knob control. It's easy to remove the belt, too; a single lever releases two idler rollers, and the belt slips right off the side. A dust port at the back of the housing works effectively when connected to a shop vacuum or dust collector.

When I placed the sander in its optional stand (as shown), it became even more useful. The stand—a table, in function—clamps to your bench in any of three positions. An adjustable fence fits in either of two positions and you can sand on either face of the belt, giving lots of options for sanding small parts. If you buy one of these compact belt sanders, I recommend you buy the stand, too, to take full advantage of the tool.

—Tested by Bob McFarlin

PRODUCT SCORECARD

Bosch 1278VS Compact Belt Sander

Performance (with stand)	★ ★ ★ ★ ★
Price	With auxiliary handle, case, and ten belts, about $140; stand, about $35.
Value	★ ★ ★ ★ ☆

S-B Power Tool Co., 4300 W. Peterson Ave., Chicago, IL 60646-5999. Call 773/286-7330. Internet: http://www.boschtools.com

Continued on page 98

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$269.95*

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6" x 12" MINI WOOD LATHE

Create projects from miniature to full-size. Heavy duty, cast iron construction for minimum vibration and high strength. Light weight and compact size allow bench top mounting or taking it on the job. Dual speed range for absolute cutting control.

- Distance between centers: 12-1/2"
- 3-1/8" wide tool rest with adjustable height
- Swing over bed: 6" • MT1 spindle
- 120V, 60 Hz, 3.2 amp motor
- 25"L x 4-3/4"W x 9-1/2"D
- Speed range – Low: 275 to 3050; High: 400 to 4450

~~$179.99~~ $129.99
ITEM 34837-5FPA

CENTRAL MACHINERY

1" BELT/ 5" DISC SANDER

Remove the belt back plate and sand all types of curves and odd shapes. With the back plate in place, you can apply pressure for faster stock removal.

- Motor: 1/3 HP, 2.4 amp, 60 Hz, 110V, 3450 RPM • Dust collection
- Table: 5" x 5", tilts to 45°
- Belt length: 30", 3450 FPM belt speed
- Shipping weight: 19 lbs.

ITEM 34951-1FPA $49.99

DRILL MASTER

TiN COATED FORSTNER BIT SETS

Titanium nitride runs cooler, cuts easier, and lasts longer than standard steel! Includes 3/8" shanks and individually organized wooden case. Rockwell hardness range from 55-65 HRC.

20 PC. SET

- 20 sizes from 1/4" to 3/4" by 16ths, 7/8", 15/16", 1" to 2" by 8ths

~~$42.99~~ $32.99
ITEM 31130-3FPA

16 PC. SET

- 16 sizes from 1/4" to 2-1/8" by 8ths

~~$39.99~~ $29.99
ITEM 32404-8FPA

CENTRAL MACHINERY

12" DIRECT DRIVE BENCH TOP DISC SANDER

Get sharp, accurate finishes without burning or marring. Direct drive disc won't slip. Table tilts to 45°; 2" dust collection outlet; fan-cooled brushless motor; miter gauge, base pads prevent creeping; safety switch. Includes 60 grit, 12" sanding pad.

- 1 HP, 120V, 14.0 amps
- No load speed: 1793 RPM
- Wheel diameter: 12" • Base: 13" x 10"
- Shipping wt.: 92 lbs.

~~$129.99~~ $99.99
ITEM 37297-1FPA

12" SANDING DISCS

GRIT	ITEM	PACK OF 2
36	38001-0FPA	$5.99
60	37958-0FPA	$5.99
120	37959-0FPA	$5.99
240	37960-0FPA	$5.99

Pittsburgh

2 PC. 3/4" HEAVY DUTY PIPE CLAMP

Constructed from heat-treated cast iron, these durable clamps keep your work rock steady. Just screw the handle side onto a 3/4" threaded pipe and slide the spring loaded end on. You're ready to go! Pipe not included.

- Handle screw operating range: 2-1/8"
- 1-1/2" throat depth
- Weight: 2-7/16 lbs.

ITEM 31255-1FPA $3.99

1/2" PIPE CLAMP

- 1-1/2" throat depth
- Weight: 1-4/5 lbs.

ITEM 37056-2FPA $2.99

RADIAL ARM RASK SAW KIT

RADIAL ARM SAW KIT

Award-winning patented design features easy setup with most 7-1/4" and 7-1/2" circular saws. Makes fast accurate bevels, rips, miters, and crosscuts. Ruggedly built and completely portable.

- Saw and table wood not included

Maximum miter & bevel: 45°; Rip capacity: 15-3/4"; Crosscut: 12-3/4"; Length: 24"; Height: 22"; Weight: 23 lbs.

~~$59.99~~ $49.99
ITEM 33576-1FPA

CENTRAL MACHINERY

10", 2 HP, BENCH TABLE SAW

Die cast aluminum table 25-3/4" x 16", has adjustable 17-7/8" x 2" rip fence and inch/metric scale for precise cutting. Blade adjustments control angle and depth of cut.

- Maximum depth of cut at 90°: 3-1/8"; at 45°: 2-1/2" • Shipping weight: 36 lbs.
- Miter gauge adjusts 0° - 60° left and right
- Motor: 2 HP, 115V, 60 Hz, 10 amp, 4500 RPM • Blade capacity: 10" with 5/8" arbor
- Blade sold separately, below

~~$119.99~~ $79.99
ITEM 35715-2FPA

10" 40 TOOTH CARBIDE TIP SAW BLADE

- 5/8" arbor

ITEM 00529-4FPA $9.99

CENTRAL MACHINERY

10" PLANER

- 2 HP, 110V, 1 phase, 11 amp, 8000 RPM
- 5-1/8" working distance
- 10-1/8" x 9-1/8" feed table
- 19" x 16-5/8" x 16" overall dimensions
- 10-1/8" blade size
- 2-blade cutter head
- 61 lbs. shipping weight
- Stand sold separately

~~$239.99~~ $199.99
ITEM 32377-3FPA

PLANER STAND

- 20" x 10" x 27"
- Shipping weight: 20 lbs.

ITEM 32969-2FPA $32.99

SET OF REPLACEMENT BLADES

ITEM 32970-2FPA $21.99

2 PC. HIGH SPEED STEEL REPLACEMENT BLADE SET

ITEM 36068-1FPA $29.99

CENTRAL MACHINERY

- VARIABLE SPEED
- BIG 12" THROAT
- 3/4 HP

12" BANDSAW

Precision three-wheeled design cuts material up to 12" wide and makes bevel cuts from 0° to 45°. Electronic variable speed from 0 to 2645 feet per minute. Includes miter gauge. Blade sold separately.

115V; Table: slotted cast aluminum: 13-1/2" x 13-1/2"; Work cap.: 12" x 4-5/8"H; Requires 62" blade; Overall dim.: 25"L x 13-1/2"W x 23-3/4"H; Shipping wt.: 32 lbs.

~~$116.99~~ $89.99
ITEM 01629-3FPA

BANDSAW BLADE

- 6 TPI

ITEM 31236-5FPA $4.99

CENTRAL PNEUMATIC CONTRACTOR SERIES

Similar to Senco LS4

18 AND 19 GAUGE AIR FINISH NAILER

Excellent balance and 2-1/2 lb. weight make this brad tacker easy to use in tight spots. With a loading capacity of 105-18 gauge brads, get more done with less down time. Using brads from 5/8" to 1-3/16", it will perform a variety of demanding tasks, from picture frames to solid, homemade furniture.

- Air consumption: 3.5 CFM at 75 PSI
- Uses 18 and 19 gauge brads
- 1/4" NPT inlet

~~$39.99~~ $29.99
ITEM 36618-5FPA

CHICAGO Electric Power Tools

3/8", 14.4 VOLT CORDLESS DRILL KIT WITH KEYLESS CHUCK

- Variable speed, reversible; 0 to 600 RPM
- Includes 6 pc. drill bit set, 6 pc. screwdriver bit set, magnetic extension bit, charger, battery, *Jacobs*® keyless chuck, and carrying case
- 6 torque settings

~~$69.99~~ $39.99
ITEM 34793-2FPA

29 PC. HIGH SPEED STEEL DRILL BIT SET

Contains 29 jobber length HSS bits from 1/16" to 1/2" by 64ths. • Steel index

- 3/8" cutdown shanks

ITEM 02642-5FPA $9.99

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These hand screws will clamp without scratching or marring your workpiece. Hardwood jaws distribute pressure evenly, and can easily be adjusted for non-parallel surfaces and odd shapes.

JAW LENGTH	JAW CAPACITY	ITEM	PRICE
6"	3"	06986 -3FPA	$2.99
7"	4-1/2"	06987 -3FPA	$3.99
8"	4-3/4"	04852 -4FPA	$4.99
10"	6"	04853 -3FPA	$5.99
12"	8-1/2"	04854 -3FPA	$6.99

CENTRAL MACHINERY

DOVETAIL MACHINE

Just place stock and pull cam handles to positively lock material in place. Allows cutting tails, pins, half blind, and standard dovetails. Accepts stock up to 12" wide and 1-1/4" thick. Includes 1/2" template.

~~$59.99~~ $49.99
ITEM 34102-4FPA

CENTRAL MACHINERY

DRILL 1/4", 3/8", & 1/2" SQUARE HOLES

MORTISING MACHINE

Make a square hole in the fraction of the time it takes by hand! Easier layout for professional mortise and tenon joints in furniture, cabinets, and restoration projects. Fence with hold down clamp keep workpieces from lifting off the table. Large capacity – up to 5" maximum height. Includes fence, work-piece clamp, and 1/4", 3/8", and 1/2" mortising chisels and bits.

- 10-7/8" x 7-3/4" base • 13-3/8" x 6" table
- 3580 RPM spindle speed
- 60 lbs. shipping wt.
- 5" max. workpiece height • 5" throat
- Accepts .745" chisel shanks
- 1/2 HP, 110V, 2.3 amps

ITEM 35570-5FPA $149.99

CENTRAL PNEUMATIC

INDUSTRIAL HVLP SPRAY GUN

Get better adhesion than standard sprayers and save over 40% in paint/material costs. This sprayer maintains 75% transfer efficiency and reduces working pressure to 10 PSI. No need to buy costly HVLP system, this gun does it for you. Low cost, quality finishes, and meets strict state and local environmental codes! Easy to use – well balanced with a textured grip handle.

- 2 position nozzle adjusts spray pattern
- 1 quart cup • Air inlet: 1/4" NPT
- CFM: 9.5 @ 50 PSI
- PSI: 50-70

~~$79.99~~ $59.99
ITEM 07901-1FPA

CENTRAL MACHINERY

6-1/8" JOINTER PLANER

- 1-3/4 HP motor handles hardwoods, softwoods, and plastics
- Variable speed from 16,000 to 32,000 CPM
- Adjustable fence tilts 45° for precise edging and chamfering
- Heavy duty die cast aluminum table
- Includes safety switch and 1-1/4" I.D. dust collection outlet
- Dimensions: 6-1/4" x 28" table; 28" x 2-5/8" fence
- Capacities: 6-1/8" planing width; 1/8" max. cutting depth

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- 4-1/2 lbs. tool wt.

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- 2" stroke, 8-1/4" swing
- Speeds: 620, 1100, 1720, 2340 and 3100 RPM
- 1/3 HP motor moves at 1720 RPM
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- 22-1/2" high, 47 lbs.

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Includes 8 tool steel cups sized 3/4", 7/8", 1-1/8", 1-1/4", 1-1/2", 1-3/4", 2", and 2-1/2", plus 1/4" and 3/8" mandrels, a 1/4" bit, a hex wrench, & a blow mold case.

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ITEM 01263-4FPA

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Includes cutting cup sizes 2-1/2", 3", 3-1/2", 4", and 5", plus 3/8" mandrell, drive plate, hex wrench, & blow mold case.

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Better Homes and Gardens®

WOOD® Magazine's 1998 Build-a-Gift™ Contest

You could win this fabulous Dodge Dakota truck or any one of the other sensational prizes by entering ***WOOD* Magazine's 1998 Build-a-Gift™ contest.**

GRAND PRIZE!
1999 Dodge Dakota

At the same time, you'll be benefiting the Toys for Tots program. Whether you're a hobbyist or a professional woodworker, everyone who enters a project can compete for all prizes.

The wood treasures you enter in the Build-a-Gift contest will be auctioned in December 1998.

All proceeds benefit the U.S. Marine Corps Reserve Toys for Tots program. Tens of thousands of dollars have been raised over the last nine years to purchase toys for less-fortunate children at Christmastime. You, as a woodworking artisan, really can make a difference.

So set aside time right now to plan and build your gift-contest entry. Read the rules and guidelines on the next page and get your entry in by November 30, 1998, and help us help kids.

Entry details are also available on our website, WOOD Online at **http://www.woodmagazine.com**

Build•a•Gift
Help us help kids

The New Dodge
Bondex PLASTIC WOOD
DELTA
DEWALT High Performance Industrial Tools
Grizzly INDUSTRIAL, INC.
JESADA TOOLS
KLINGSPOR
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LEATHERMAN
MLCS Router Bits & Professional Woodworking Products
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WOOD® Magazine's 1998 Build-a-Gift™ Contest Prizes and Sponsors

All entries will be judged on craftsmanship, originality, durability and finish. Toy entries will include the aforementioned judging criteria with the inclusion of safety, kid-appeal, and play value. Durability will not apply to scrollsaw entries.

GRAND PRIZE – Best of Show

- Dodge Dakota Truck - $16,900 estimated retail value

Best Originality

- Delta $1,700 Unisaw Model 36-820
- Delta $800 14" Band Saw Model 28-280
- Flecto Varathane Clear Wood Finish supply valued at $120

Best Toy

- Grizzly Industrial, Inc. Stationary Power Tools valued at $2,500

Best Craftsmanship

- DeWALT Tools valued at $2,000

Best Use of Wood

- DeWALT Tools valued at $2,000

Best Transportation Vehicle Replica

- Milwaukee Electric $1,050 Compound Miter Saw Portable Power Tool, Model #6496-6
- Flecto Varathane Clear Wood Finish supply valued at $120

Best Furniture (medium)

- Ryobi assorted tools valued at $1,000
- Flecto Varathane Clear Wood Finish supply valued at $120

Best Clear Finish

- Zinsser $500 cash award plus $50 worth of Zinsser's Bulls Eye Shellac

Best Furniture (small)

- Makita $481 14.4V Cordless Drill Kit

Best Scrollsaw Project

- MLCS $350 Gift Certificate

Best Turning Project

- Meisel Hardware Specialties $250 Gift Certificate
- Bondex Plastic Wood brand products valued at $50
- Leatherman $50 Pocket Survival Tool
- Klingspor's $30 best-selling 20 lb. box of assorted sandpapers

Best Carving Project

- Klock It $250 Gift Certificate
- Bondex Plastic Wood brand products valued at $50
- Leatherman $50 Pocket Survival Tool

Best Dyed or Painted Finish

- Wagner Spraytech HVLP Sprayer valued at $189
- Bondex Plastic Wood brand products valued at $50
- Leatherman $50 Pocket Survival Tool

Best Doll House Furniture

- Pro-Tech Power, Inc. $169 Scrollsaw
- Bondex Plastic Wood brand products valued at $50
- Leatherman $50 Pocket Survival Tool

Best Doll House

- Storehorse, Inc. $165 in merchandise: Storehorse Folding Sawhorses & Accessories, Storestool, and Storebench
- Bondex Plastic Wood brand products valued at $50
- Leatherman $50 Pocket Survival Tool

Best Holiday Home Accessory

- Jesada $129 Six-piece 1/2" Shank Router Bit set Model #600-504
- Bondex Plastic Wood brand products valued at $50
- Leatherman $50 Pocket Survival Tool

Winners of each of the following categories receive all of the prizes below.

Best Educational Toy / Best Holiday Ornament / Best Home Decorative Accessory

- Leatherman $50 Pocket Survival Tool
- Klingspor's $30 best-selling 20 lb. box of assorted sandpapers
- Bondex Plastic Wood brand products valued at $50

Other Contributors:

Adams Wood Products Ltd., L.P.

Prize values given are suggested retail price.

CONTEST RULES

1.) No purchase necessary to enter or win.
2.) Entries must fit into a box no larger than 2'x2'x2'. The primary material should be wood but may incorporate other materials.
3.) For toy entries please follow Consumer Product Safety Commission guidelines: non-toxic wood finishes only; no parts smaller than 1-1/4" square on toys or gifts for children under three years of age; no sharp corners or points; pull strings on children's toys longer than 12" should not have beads or other attachments that could tangle and form a loop.
4.) Entries must be received by November 30, 1998. All entries must be postpaid; collect entries will be refused. Attach an entry label, photocopy of an entry label, or a 3-1/2"x5" card with entry information and your name and address to each entry. Up to 5 entries per person allowed. Winners limited to one prize per entry.
5.) Projects built from existing plans, and projects built from original designs will be eligible for all prizes.
6.) Entry constitutes permission to use winner's name, hometown and photograph for promotional purposes, unless prohibited by law. Employees and immediate family members of Meredith Corporation and co-sponsors and their affiliates and subsidiaries are ineligible.Open to USA residents only.
7.) Winners will be selected and notified by mail on or about December 15, 1998 and will receive the prize directly from the manufacturer/distributor. For a list of winners, send a separate, self-addressed stamped envelope after January 4, 1999 to BUILD-A-GIFT, 333 N. Michigan Ave., Suite 1101, Chicago, IL 60601.
8.) All entries will be offered at an auction under the supervision of Meredith Corporation and all proceeds from such auction will be donated to the U.S. Marine Corps Reserve Toys for Tots program.
9.) A panel of representatives from the U.S. Marine Corps Reserve, Meredith Corporation, and woodworking experts will judge all entries on or about December 4, 1998 on craftsmanship, originality, durability, and finish. Toy entries will be judged on craftsmanship, originality, durability, finish, safety, kid appeal and play value. Durability will not apply to scrollsaw entries. All decisions of the panel are final.
10.) Original design entries: Project must be your own original design and not made from published patterns. A different approach to an existing project could qualify.
11.) Winners are responsible for applicable taxes.
12.) Best of Show Prize: 1999 Dodge Dakota Truck. Approximate retail value $16,900. Taxes, license, insurance, registration fees and all other incidental expenses are sole responsibility of winner. Vehicle will be available for winner to pick up from a dealer authorized by Dodge on or about December 30, 1998. No prize substitution or transfer or cash in lieu of prize.

WOOD® Magazine's 1998 Build-A-Gift Contest Entry Form

There is a limit of five (5) entries per person. Please provide the following information for each entry submitted.

My entry is best suited for the following category: _____

☐ **My entry is an original design.** I certify that I have designed and built this project myself. Should my entry win, I agree to cooperate with WOOD Magazine to supply builder's notes and a bill of materials for publication.

Signature _____

Date _____

☐ **My entry is built from plans.**

Signature _____

Date _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone (_____) _____

Send projects to: WOOD Magazine's Build-a-Gift Contest, c/o Kristi Hasek–Level B, 1912 Grand Avenue, Des Moines, IA 50309

1998 BUILD-A-GIFT PROJECT ENTRY DEADLINE: November 30, 1998

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Continued from page 88

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Continued on page 106

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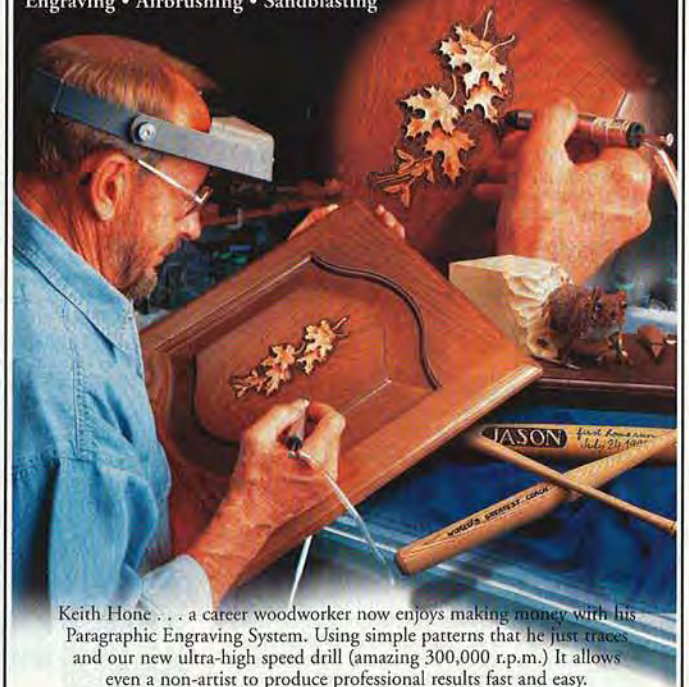

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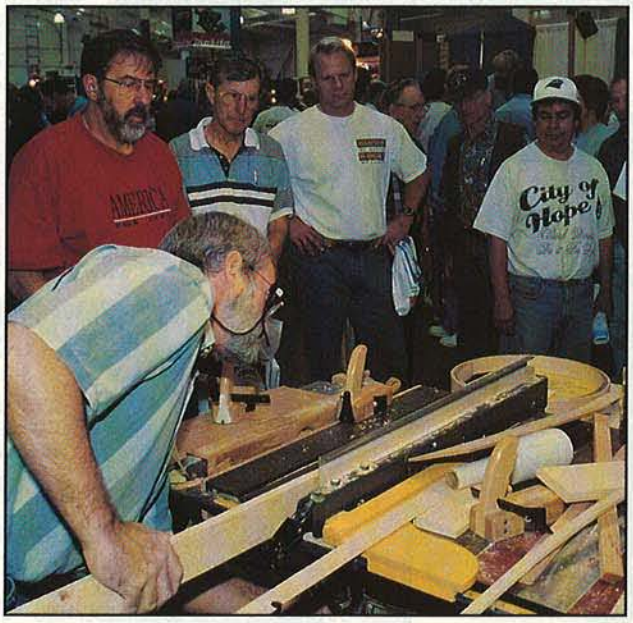

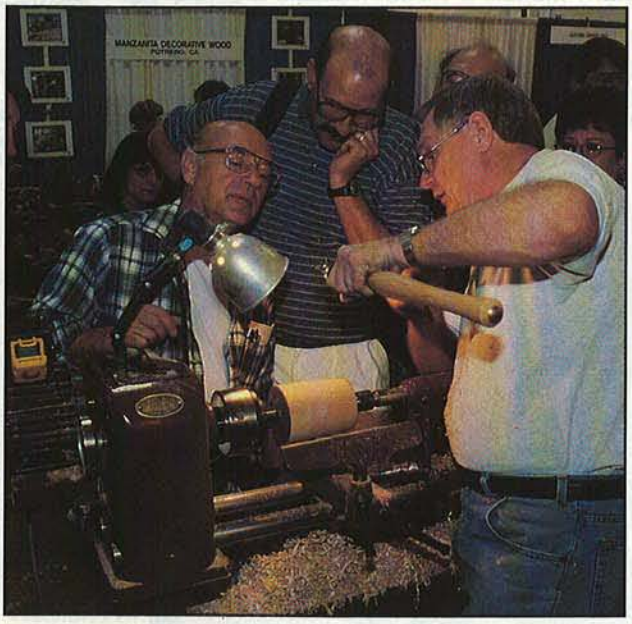

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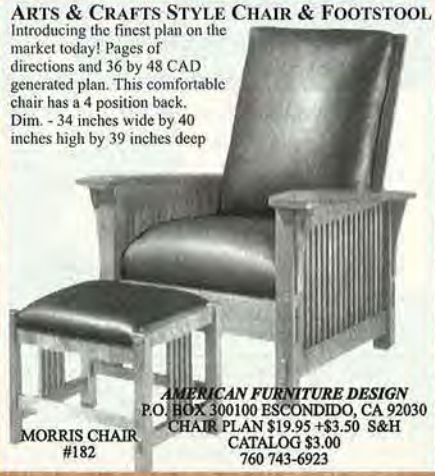

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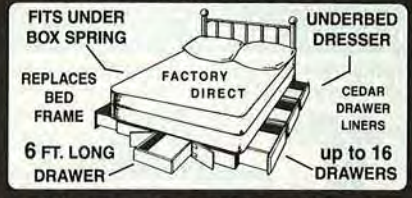

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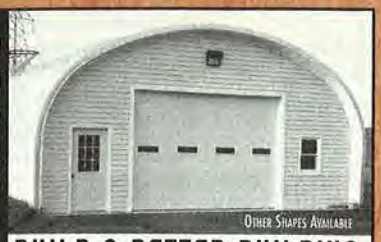

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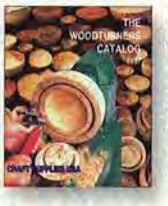

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Continued from page 98

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Print this article

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The current U.S. lineup consists of 14 products including two portable circular saws, a power hand planer, router, jigsaw, shop vacuum, two cordless drills, two half-sheet finishing sanders, detail sander, two random-orbit sanders, portable work stand, and various accessories.

With selling prices ranging from $268 for the detail sander and $292 for the jigsaw to $463 for a portable circular saw (with rail guide), you won't find these tools in the bargain basement of your local tool distributor. But if precision, durability, ergonomics, and effective dust collection mean a lot to you, give this new line a look. We will include Festo products in upcoming reviews of portable power tools.

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Roundover Bits
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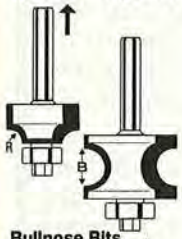
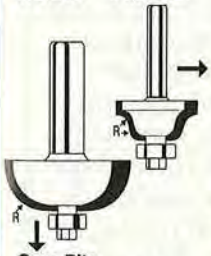
1/4" Shank	Radius	
WL-1040	1/16"	$9.
WL-1041	1/8"	$9.
WL-1042	3/16"	$9.
WL-1043	1/4"	$9.
WL-1044	5/16"	$10.
WL-1045	3/8"	$11.
WL-1046	1/2"	$13.
1/2" Shank		
WL-1049	1/8"	$9.
WL-1042-5	3/16"	$9.
WL-1050	1/4"	$9.
WL-1044-5	5/16"	$10.
WL-1051	3/8"	$12.
WL-1052	1/2"	$13.
WL-1053	5/8"	$16.
WL-1054	3/4"	$18.
WL-1055	7/8"	$25.
WL-1056	1"	$27.
WL-1057	1-1/8"	$30.
WL-1058	1-1/4"	$30.



Bullnose Bits
with Bearing
1/4" Shank • Bead Opening

WL-1100	1/4"	$12.
WL-1101	3/8"	$14.
WL-1102	1/2"	$16.
WL-1103	5/8"	$18.
WL-1104	3/4"	$19.
1/2" Shank		
WL-1110	1/4"	$12.
WL-1111	3/8"	$14.
WL-1112	1/2"	$16.
WL-1113	5/8"	$18.
WL-1114	3/4"	$19.
WL-1115	1"	$22.
WL-1116	1-1/8"	$25.
WL-1117	1-1/4"	$28.
WL-1118	1-1/2"	$32.



Cove Bits
1/4" Shank • Radius

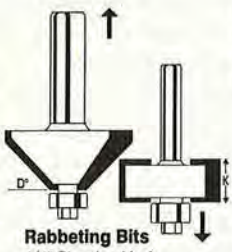
WL-1159	1/8"	$10.
WL-1160	3/16"	$10.
WL-1161	1/4"	$11.
WL-1162	3/8"	$13.
WL-1163	1/2"	$14.

Cove Bits (continued)
1/2" Shank

WL-1169	1/8"	$10.
WL-1170	1/4"	$11.
WL-1171	3/8"	$13.
WL-1172	1/2"	$14.
WL-1173	5/8"	$18.
WL-1174	3/4"	$20.

Chamfer Bits
1/4" Shank • Degree

WL-1180	15°	$10.
WL-1181	25°	$10.
WL-1182	45°	$12.
WL-1183	45°	$14.
(for up to 3/4" material)		
1/2" Shank		
WL-1184	45°	$10.
WL-1185	11-1/2°	$12.
WL-1186	15°	$12.
WL-1187	22-1/2°	$12.
WL-1188	30°	$14.
WL-1189	45°	$15.
WL-1190	45°	$22.
(for up to 1-1/4" material)		



Rabbeting Bits
1/4" Shank • Kerf

WL-1220	1/2"	$11.
WL-1220-2	1/16"	$10.
WL-1220-3	1/8"	$10.
WL-1220-4	1/4"	$10.
WL-1220-5	3/8"	$10.
1/2" Shank		
WL-1225	1/2"	$11.
WL-1225-2	1/16"	$10.
WL-1225-3	1/8"	$10.
WL-1225-4	1/4"	$10.
WL-1225-5	3/8"	$10.
WL-1225-6	3/4"	$12.

Roman Ogee Bits
1/4" Shank • Radius

WL-1230	5/32"	$13.
WL-1231	1/4"	$15.
1/2" Shank		
WL-1235	5/32"	$13.
WL-1236	1/4"	$15.

Double Roman Ogee
1/4" Shank • Radius

WL-1240	5/32"	$18.
WL-1241	1/4"	$20.
1/2" Shank		
WL-1245	5/32"	$18.
WL-1246	1/4"	$20.

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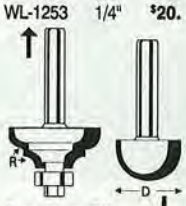
1/4" Shank • Radius

WL-1250	5/32"	$18.
WL-1251	1/4"	$20.
1/2" Shank		
WL-1252	5/32"	$18.
WL-1253	1/4"	$20.

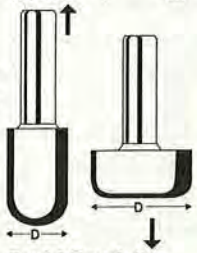


Core Box Bits
1/4" Shank • Diameter

WL-1370	1/8"	$10.
WL-1371	1/4"	$8.
WL-1371-1	3/8"	$9.
WL-1372	1/2"	$10.
WL-1373	3/4"	$12.

Roundnose/Core Box
1/2" Shank • Diameter

WL-1375	1/4"	$8.
WL-1375-1	3/8"	$11.
WL-1376	1/2"	$12.
WL-1377	3/4"	$14.
WL-1378	1"	$16.

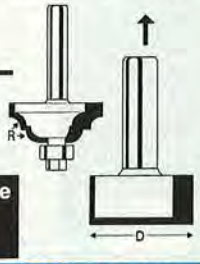


Bowl & Tray Cutter
1/4" Shank • Diameter

WL-1380	7/16"	$13.
WL-1381	3/4"	$15.
1/2" Shank		
WL-1385	3/4"	$15.
WL-1386	1-1/4"	$18.

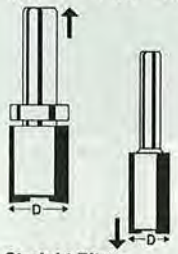
Dado & Planer Bit
1/4" Shank • Diameter

WL-1390	3/4"	$12.
1/2" Shank		
WL-1391	3/4"	$12.
WL-1392	1"	$14.
WL-1393	1-1/4"	$15.
WL-1394	1-1/2"	$16.
WL-1395	2"	$28.



Pattern Cutting Bit
1/4" Shank • Diameter

WL-1400	1/2"	$12.
WL-1401	5/8"	$12.
WL-1402	3/4"	$12.
1/2" Shank		
WL-1405	3/4"	$15.
WL-1406	1-1/8"	$16.

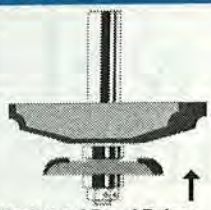


Straight Bits
1/4" Shank • Diameter

WL-1001	1/8"	$10.
WL-1002	3/16"	$5
WL-1002-5.5	5.5mm	$5.
(for undersized 1/4" plywood)		
WL-1003	1/4"	$5.
WL-1004	5/16"	$5.
WL-1005	3/8"	$5.
WL-1006	15/32"	$5.
(for undersized 1/2" plywood)		
WL-1007	1/2"	$6.
WL-1008	9/16"	$6.
WL-1009	5/8"	$7.
WL-1010	23/32"	$8.
(for undersized 3/4" plywood)		
WL-1011	3/4"	$9.
WL-1012	1"	$10.
1/2" Shank		
WL-1020	15/64"	$5.
(for undersized 1/4" plywood)		
WL-1021	1/4"	$5.
WL-1019	5/16"	$5.
WL-1022	3/8"	$5.
WL-1023	7/16"	$5.
WL-1024	15/32"	$5.
(for undersized 1/2" plywood)		
WL-1025	1/2"	$6.
WL-1027	5/8"	$8.
WL-1028	23/32"	$8.
(for undersized 3/4" plywood)		
WL-1029	3/4"	$9.

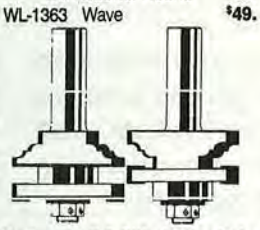
Corner Lock Mitres
For up to 5/8" material
WL-1420-2 1/4" shank $25.
For 1/2" to 3/4" material
WL-1420-1 1/2" shank $30.
For material 3/4" to 1-1/4"
WL-1420 1/2" shank $38.

For the Shaper Lock Mitre WL-1581 $40.



Horizontal Panel Raiser with Undercutter • 1/2" Shank

WL-1346	Ogee	$49.
WL-1347	Traditional	$49.
WL-1348	Convex (Cove)	$49.
WL-1359	12° Facecut with Quarter Round	$49.
WL-1363	Wave	$49.

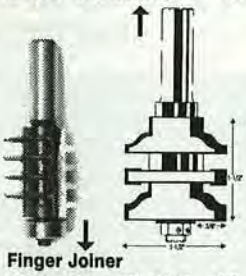


2-piece Rail & Stile Cutter Sets

1/2" Shank		Set
WL-1360	Ogee Profile	$59.
WL-1361	Roundover	$59.
WL-1362	Cove & Bead	$59.

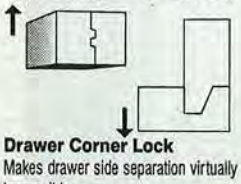
1-piece Rail & Stile Cutter Sets
Just raise the cutter to make the matching cut. No changing or reversing.

1/2" Shank		
WL-1365	Ogee Profile	$49.
WL-1366	Roundover	$49.
WL-1367	Cove & Bead	$49.
WL-1368	Wedge	$49.
WL-1374	Dbl Roundover	$49.



Finger Joiner
Router Bit WL-1429 $39.
For the Shaper WL-1580 $89.

Reversible Glue Joint
WL-1430 1-3/4" Diam $35.
For the Shaper WL-1706 $35.

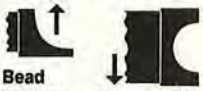


Drawer Corner Lock
Makes drawer side separation virtually impossible
1/2" Shank
WL-1435 For 1/2" material $30.

SHAPER CUTTERS
3/4" BORE

Corner Round

WL-1509	1/8"	$22.
WL-1510	1/4"	$24.
WL-1511	3/8"	$26.
WL-1512	1/2"	$26.
WL-1513	3/4"	$30.
WL-1514	1"	$32.
WL-1515	1-1/4"	$38.

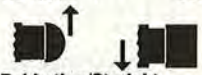


Bead

WL-1520	1/4"	$24.
WL-1521	3/8"	$26.
WL-1522	1/2"	$26.
WL-1523	3/4"	$28.
WL-1524	1"	$30.

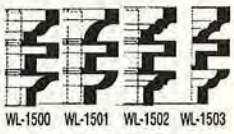
Flute

WL-1530	1/4"	$24.
WL-1531	3/8"	$26.
WL-1532	1/2"	$26.
WL-1533	3/4"	$28.
WL-1534	1"	$30.



Rabbeting/Straight

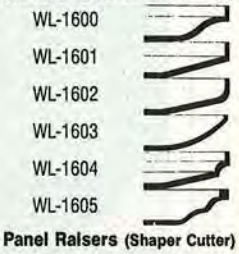
WL-1540	1/4"	$24.
WL-1541	3/8"	$26.
WL-1542	1/2"	$26.
WL-1543	3/4"	$28.
WL-1544	1"	$30.
WL-1545	1-1/2"	$32.
WL-1546	2"	$48.



WL-1500 WL-1501 WL-1502 WL-1503

SHAPER CUTTERS 3/4" BORE
1-piece Rail & Stile
Just raise the cutter to make the matching cut. No changing or reversing.

WL-1500	Roman Ogee	$89.
WL-1501	Roundover	$89.
WL-1502	Cove & Bead	$89.
WL-1503	Dbl Roundover	$89.



Panel Raisers (Shaper Cutter)
3/4" Bore

WL-1600	Ogee	$59.
WL-1601	15° Facecut	$59.
WL-1602	18° Traditional	$59.
WL-1603	Convex (Cove)	$59.
WL-1604	12° Facecut with Quarter Round	$59.
WL-1605	Wave	$59.

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Circle No. 1395

Dealing with dowel joints

How to make old ones good as new

Use a small, dull chisel to remove the remaining pieces of dowel left in the holes.

Follow pro craftsman Bob Flexner through the steps of repairing dowel joints, and see how to reglue others in the article on *page 39*.

Norman, Oklahoma, furniture restorer Bob Flexner's research has shown that dowel joints were popular in furnituremaking following the Industrial Revolution. Machine-made dowels were readily available, and drilling holes and installing them was quick compared to mortise-and-tenon joints.

"You *can* treat a dowel joint like a mortise-and-tenon. Clean the dowel, clean the hole, then reglue," Bob comments. "But, you're taking a chance because the dowel is a separate piece of wood that may come loose in the side you didn't reglue."

That's why in valuable antique furniture, he carefully and completely removes all the dowels, cleans them, and reuses them in the reglue. This tactic also keeps all parts original to preserve the piece's value.

"On more common furniture, I tend to replace all the dowels for structural integrity. A vise on my workbench keeps both hands free," he says.

Before sawing off a stubborn dowel, make sure to record any angle that it may have coming out of the hole.

With his drill and a brad-point bit 1/16" smaller than the dowel hole, Bob drills out the old dowel.

To get dowels out, Bob first lightly taps them on the ends, hoping to loosen the dried glue. Then, with a pliers he wiggles the dowels and pulls out those that will come. "Forcing those that won't only splits the dowels," he notes. "It's better to saw them off and drill out the hole."

Before Bob saws off a dowel, he records any angle that it may have with a bevel tool. Then, he refers to the angle later when he drills out the hole for a new one.

"Because American dowels are normally 3/8" or 7/16" in diameter, I want to use a drill bit 1/16" smaller," Bob explains. "And a brad-point bit easily centers in the hole so you don't damage the sides. When you get to the end of the hole, you'll feel a little jolt. That's the air pocket between the dowel and dowel-hole bottom. Now what's left is a 1/32"-thick rim of dowel around the hole. Remove it and the hole is back in original shape."

With a small, dull chisel, he breaks what's left of the dowel away from the hole wall while avoiding enlarging it, then he shakes the resulting pieces out. With a dull 3/8" drill bit (or 7/16" for the larger size hole), Bob cleans the remaining glue from the hole sides. Any remaining dried glue he removes with a needle-nosed rasp. Glue on flat surfaces of mating pieces he takes off by hand with a cabinet scraper.

Written by Peter J. Stephano Photographs: Bob Hawks Graphic Design: Perry McFarlin

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31-695	6" Belt/9" Disc Sander	441	299
23-710	New Sharpening Center	217	145
23-680	6" Bench Grinder 1/4 HP	80	69
31-460	4" Belt/Disc Sander	198	119
40-560	16" 2 speed Scroll Saw	230	155
40-540	16" var/spd Scroll Saw	249	179
11-990	12" Bench Drill Press	255	184
11-090	32" Radial Bench Drill Press	405	279
43-505	1/2" Bench Router/Shaper	398	299
22-540	12" Bench Top Planer	Sale	259
28-195	10" Band Saw	390	309
22-560	12-1/2" Planer w/ extra knives		389
36-865	Versa Feeder Stock Feeder		259
36-220	10" Compound Mitre Saw	294	199
28-185	Bench Band Saw	213	168
36-240	10" Sliding Mitre Saw	589	439
37-070	6" v/spd Bench Jointer	351	265
14-650	Hollow Chisel Mortiser	380	239
33-990	10" Radial Arm Saw	981	799
17-900	16-1/2" Floor Drill Press	490	349
37-190	6" Deluxe Jointer	603	445
36-285	8-1/4" Builders Saw w/ stand	Sale	268
36-210	10" Compound Mitre Saw	344	199
34-555	Sliding Table	487	289
36-250	10" Slide Compound Saw	825	449
31-780	Oscillating Spindle Sander	253	194
31-780K	31-780 w/ 31-781 spindle set		209
46-700	12" Wood Lathe	575	465
40-650	Q3 18" Scroll Saw	Sale	389
36-905	30" Unifence	346	255
36-906	50" Unifence	444	325
34-444	10" Contractors Table Saw	Sale	579

The following tools have a $50.00 rebate ! Price shown is before rebate.

36-455	10" Contractors Table Saw w/ 30" unifence, cast iron wing, 34-914 table board, & carbide blade	Sale	839
22-675	DC380 15" Planer	Sale	1175
28-275	14" Band Saw 3/4 HP	Sale	595
28-280	14" Band Saw 1 HP motor with enclosed stand	Sale	739
28-280Z	14" Band Saw 1 HP w/ 50-274 mobile base, 28-843 rip fence, & 28-266 cool blocks	Sale	839
31-280	Sanding Center w/ stand	Sale	789

NEW Single Stage Dust Collectors

50-840	1 HP, 650 CFM	270	225
50-850	1-1/2 HP, 1200 CFM	Sale	309
50-851	2 HP, 1500 CFM	Sale	455

MILWAUKEE TOOLS

6527	NEW Sawzall with case	343	169
6537-2	6527 w/quick lok blade change	224	175
0407-22	12V Drill w/kyls chuck&2 batt	380	175
0224-1	3/8" Drill 4.5 amp magnum	236	132
0234-6	1/2" Drill 4.5A mag 0-850 rpm	255	134
0235-1	1/2" Drill w/keyless chuck	255	142
0244-1	1/2" Drill 4.5A mag 0-600 rpm	255	134
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	213	119
0228-6	3/8" Drill 3.5 amp 0-1000 rpm	207	109
0375-1	3/8" close quarter Drill	255	148
0379-1	1/2" close quarter Drill	288	165
6546-6	cdls Scrwdvr 200 & 400 rpm	150	89
6547-6	6546-1 w/bits,1/4" chuck & cs	185	108
5399	1/2" D-hdle Hammer Drill Kit	356	219
5397-1	3.8" v/ spd Hammer Drill Kit	275	145
5371-6	1/2" v/ spd Hammer Drill Kit	360	194
3107-6	1/2" v/spd right angle Drill Kit	411	234
3300-1	1/2" v/ spd right angle Drill	378	219
6142	4-1/2" Grinder w/cse & acc.	224	129
6490-6	10" Mitre Saw	496	265
6491	6490 w/ carbide blade & bag	594	328
6494-6	10" Compound Mitre Saw	585	315
6266-6	Top Handle Jig Saw	315	159
6496-6	10" Slide Compound Saw	1050	569

FREUD CARBIDE TIPPED SAW BLADES
5/8" Bore - Industrial Grade

Item	Description	Teeth	List	Sale
LU72M010	Gen Pur. A.T.B.	10" 40	69	42
LU82M010	Cut-off	10" 60	93	44
LU84M011	Comb	10" 50	78	45
LU85M010	Super Cut-off	10" 80	115	59
LM72M010	Ripping	10" 24	69	38
LU73M010	Cut off	10" 60	84	49
LU87M010	Thin Kerf	10" 24	72	45
LU88M010	Thin Kerf	10" 60	88	49
LU98M010	Ultimate	10" 80	128	68
LU91M010	Compnd Mitre	10" 60	88	54
F410	Quiet Blade	10" 40	95	49
SD308	8" Dado - Carbide		230	119
SD508	8" carbide w/case & shims		344	168
FB100	16 piece Forstner Bit Set		338	194
94-100	5 pc. Router Bit Door System		320	169
FT2000E	Plunge Router		Sale	205
JS102	Biscuit Jointer		Sale	119

HITACHI TOOLS

C8FB2	8-1/2" Slide Compound Saw	1169	449
C10FS	10" Slide Compound Saw	1627	699
C15FB	15" Mitre Saw	1346	645
NV45AB	Coil Roofing Nailer	935	379
C10RA	NEW 10" Table Saw	632	319

MAKITA TOOLS

Model	Description	List	Sale
5090DW	3-3/8" Saw Kit 9.6 volt	280	155
DA391D	3/8 angle Drill 9.6V	166	114
DA391DW	3/8" angle Drill Kit 9.6V	341	189
ML902	Incandescent Flashlight 9.6V		14.95
6095DWE	9.6 volt Drill Kit w/2 batt	Sale	125
6095DWLE2	6095DWE w/flashlight	Sale	139
6095D	6095DW Drill only & cse	Special	65
632007-4	9.6 volt Battery	47	30
632002-4	7.2 volt Battery	39	28
6203DWAE	9.6V 3/8" Drill Kit w/2 batt	351	159
6211DWHE	12V 3/8" Drill Kit w/2 batt	368	175

CORDLESS DRILLS
WITH 2.0 AMP HIGH CAPACITY BATTERIES

6213DWAE	12V 3/8" Drill Kit	325	169
6233DWAE	14.4V 3/8" Drill Kit	358	205
9900B	3"x21" Belt Sander w/bag	347	179
9924DB	3"x24" Belt Sander w/bag	360	189
N1900B	3-1/4" Planer with case	263	142
1912B	4-3/8" Planer	352	205
N9514B	4" Disc Grinder 4.8 amp	118	65
DA3000R	3/8" Angle Drill	355	185
2708W	8-1/4" Table Saw	637	295
6405	3/8" Drill Rev. 0-2100 rpm.	115	65
6013BR	1/2" Drill Rev. 6 amp	270	159
9401	4" x 24" Belt Sander w/bag	458	235
5007NB	K7-1/4" Circ Saw w/ case	250	125
LS1011	10" Slide Compound Saw	995	429
LS1211	12" Slide Compound Saw	1620	695
3901	Plate Joiner Kit	376	209
3612C	3 HP Plunge Router	492	269
LS1040	10" Cmpnd Miter Saw	460	259
LS1013	10" Dual Compound Slide Miter Saw	1088	599
BO5010	5" Random Orbit Sander	142	72
LS1220	NEW 12" Compound Miter Saw	379	
9227C	NEW 7/9" Polisher	350	195
SJ401	NEW 16" Bench Scroll Saw	300	175

SENCO AIR NAILERS

SFN1+	Finishing Nailer 1 - 2" w/ cs	448	299
SN325	Nailer 1-7/8 - 3-1/4"	665	365
SLP20	Pinner w/cs 5/8 -1-5/8"	422	229
SKS	Stapler 5/8 - 1-1/2"	390	279
SN70	Framing -Clip Hd 2 - 3-1/2"	725	449
SN65	Framing -Full Hd 2 - 3-1/2"	709	379
SN600	NEW Framing 2 - 3-1/2"	699	369
SFN40	Finish Nailer 1-1/4 - 2-1/2	569	349

NEW Accuset Nailers by SENCO

A100LS	Finish Stapler 1/2" - 1"	180	119
A150LS	Finish Stapler 1/2" - 1-1/2"	220	149
A125BN	Brad Nailer 5/8" - 1-1/4"	160	99
A200BN	Brad Nailer 5/8" - 2"	215	139

BOSTITCH AIR NAILERS

Model	Description	List	Sale
N80S-1	Stick Nailer	Super Sale	325
RN45	Coil Roof Nailer 3/4 - 1-3/4	845	359
N60FN-2K	Finishing Nailer w/ case	557	275
BT35-2K	Brad Tacker 5/8" - 1-3/8" with case, oil, & brads	279	125
CWC100	1 HP Pancake Compressor	440	305
MIIIFS	Flooring Stapler 15 gauge	902	529
S32SX-1K	Finish Stapler-1/2" - 1-3/8" with case & oil	269	145

JORGENSEN ADJUSTABLE HANDSCREWS

Item#	Jaw Length	Opening Capacity	List	Sale	Box of 6
#0	8"	4-1/2"	20.35	12.10	66.95
#1	10"	6"	23.30	12.90	71.95
#2	12"	8-1/2"	26.75	14.90	83.95
#3	14"	10"	33.85	18.55	105.75

PONY CLAMP FIXTURES

Model	Description	List	Sale	Lots of 12
50	3/4" Black Pipe	15.45	8.50	92.50
52	1/2" Black Pipe	12.65	6.95	74.95

PANASONIC CORDLESS

EY6100FQKW	12V 3/8" Drill kit w/ 2 Ironman batteries, 15 min. charger, & case	379	179
EY6101FQKW	12V 1/2" Drill w/ 2 Ironman batteries, 15 min. charger, & case	324	199
EY6230FQKW	NEW 15.6V Drill Kit with 2 Ironman batteries, 30 minute charger & case	425	209
EY3503FQWKW	NEW 5-3/8" 12V Wood Cutting Saw Kit	500	259

BIESEMEYER FENCES

B-50	50" Commer. Saw	443	325
T-SQUARE 52	52" Homeshop	360	275
T-SQUARE 40	40" Homeshop	335	255
T-SQUARE 28	28" Homeshop	325	245

AIRY AIR NAILERS

Model	Description	List	Sale
0241SK	Brad Nailer 3/8" - 1-9/16"	180	98
0626SK	1/4" Crown Stapler 3/8" - 1"	194	98

Above nailers come w/case, fasteners, oil & wrenches

0241/0626
0241 Brad Nailer, 0626 Stapler, case, fasteners, oil, & wrenches
Super Sale 129.95

STABILA LEVELS

25010	10" die cast Torpedo Level	43	29
24640	24" Level w/ hand holes	62.20	43
24670	48" Level w/ hand holes	79.70	58
24610	48" Level w/ angle setter vial	80	59

DEWALT TOOLS

Model	Description	List	Sale
DW309K	NEW Recipro Saw 10 amp.	318	169
DW378G	NEW 7-1/4" Framer's Saw	210	169
DW222	3/8" Drill, 0-1200 rpm, 6.7 amp	184	99
DW231	1/2" Drill, 0-850 rpm, 7.0 amp	240	129
DW236	1/2" Drill, 0-850 rpm, 7.8 amp with keyless chuck	264	149
DW124K	1/2" right angle Drill	590	329
DW321K	Top Handle Jigsaw Kit	300	164
DW364	7-1/4" Circ. Saw w/brake	294	162
DW610	1-1/2 HP 2 handle Router	266	149
DW411K	1/4 sheet Palm Sander w/ cse	88	58
DW682K	Biscuit Joiner with case	448	199
DW705	12" Compound Mitre Saw	734	359
DW625	3 HP v/ spd PlungeRouter.	Sale	279
	DW625 router comes with DW6913 edge guide !		
DW621	2 HP Plunge Router	400	218
	DW621 comes with Free DW6956 fine height adjuster !		
DW675K	3-1/8" Planer with case	292	164
DW677K	3-1/4" Planer w/ case	268	155
DW431	3 x 21 v/spd Belt Sander	338	188
DW421	5" Palm Ran. Orb Sander	144	74
DW423	Palmgrip Random Orbit Sander - variable speed	170	94
	DW421 & DW423 come with Free DW4317 case !		
DW673K	Laminate Trimmer Kit	364	188
DW272	Drywall Gun, 0-4000, 6.3 amp	160	95
DW276	Drywall Gun, 0-2500, 6.5 amp	160	95
DW935K	14.4V 5-3/8" Trim Saw Kit	444	237

DEWALT CORDLESS DRILLS

DW952K-2	2 3/8" v/spd w/ two 9.6V XR batteries	284	129
DW972K-2	2 3/8" variable speed w/ two 12V XR batteries	362	182
DW972KQ-2	Above drill kit with 15 minute charger	Sale	229
DW904	12 volt flashlight		24.95
DW991K-2	2 3/8"variable speed w/ two 14.4V XR batteries	415	209
DW991KQ-2	Above drill kit with 15 minute charger	Sale	245
DW994KQ	1/2" variable speed w/ one 14.4V XR batteries	458	239
	Above drill kits come w/ charger & steel case !		
DW991KS-2	DW991K drill, DW935 trim saw, 2 XR batteries & case.	Sale	345

DEWALT 18 VOLT CORDLESS TOOLS

DW938K	Recipro Saw Kit	520	269
DW995K	1/2" Drill Kit	428	229
DW997K	1/2" Drill/Hammer Drill Kit	454	249
DW936K	5-3/8" Saw Kit	458	249
DW995KS-2	DW995K Drill, DW936 Saw and case	Sale	385
DW991KC-2	DW991K 14.4V drill kit, DW937 14.4V recipro saw,& case		375
DW995KC-2	DW995K 18V drill kit, DW938 18V recipro saw, & case		395
DW997KC-2	DW997K 18V drill kit, DW938 18V recipro saw, & case		415

DEWALT BENCH TOP TOOLS

DW708	12" Dual Compound Slide Mitre Saw	Sale	649
DW788	20" Scroll Saw	Sale	469
DW733	12" Planer	Sale	435
DW744	10" Portable Table Saw	Sale	499
DW756	NEW 6" Bench Grinder	164	75
DW758	NEW 8" Bench Grinder	184	115

BOSCH

Model	Description	List	Sale
1587VS	Top Handle "CLIC"Jig Saw	292	139
1587AVSC	1587VS 50th Anniversary saw with case	Sale	149
1584VS	Barrel"CLIC"Jig Saw	288	139
	Bosch Metal Case for above Jig Saws		24
	Bosch 30 blade assortment for Jig Saws		28.99
	1584VS or 1587VS		
	with steel case and 30 Bosch blades	Sale	175
1295DH	5" Random Orb Palm Sndr	145	89
1274DVS	3"x21" v/spd Belt Sander	301	175
1278VSK	1-1/2"x12" Belt Sander	218	129
1275DVS	3"x24" v/s Belt Sndr	379	214
1276DVS	4"x24" v/s Belt Sndr	408	229
1194VSR	1/2" v/ spd Hammer Drill	272	155
1194VSRK	above Drill w/ case	303	169
1604A	1-3/4 HP 2 Handle Router	269	142
1613EVS	2HP v/s Plunge Router	369	199
1615EVS	3 HP v/s Plunge Router	536	305
1634VSK	Recip Saw 10.5 amp	335	185
3315K	12V T-handle Drill Kit	345	159
3615K	14.4V Drill Kit	354	174
3107DVS	5" Random Orbit Sander	165	98
3107DVSK	3107DVS with case	195	115
3725DVS	5" Random Orbit Sander	256	145
3727DVS	6" Random Orbit Sander	266	149
B3915	10" Slide Compound Saw	1050	559
11224VSR	7/8" SDS Rotary Drill	404	229
1703AEVS	5" Grinder - 8.5 amp	245	139

Introducing the NEW Bosch Routers

1617	1-3/4 HP Router - 2 handle	Sale	169
1617EVS2	HP Router w/ variable speed - 2 handle	Sale	189
1618	1-3/4 HP Router - "D" handle	Sale	179

PORTA NAILER

401	Porta Nailer complete	295	209
501	Face Nailer complete	295	209

DAVID WHITE

LP6-20	Sight Level package - 20x	329	215
LP6-20XL	LP6-20 w/9056 tripod & 7620 rod	275	
LT8-300	Level Transit - 26x	739	489
LT8-300P	above Level w/ optical plum	869	589
LT6-900	Level Transit - 20x	419	279
ALT6-900A	Auto Level - Transit -18x	666	455
ALTP6-900	above Level with tripod & rod	799	525
AL8-22S	Automatic Level - 22x	583	295
AL8-26S	Automatic Level - 26x	854	325

JET TOOLS

JJ60S	6" Jointer - open stand	Sale	429
JJ6CSX	6" Jointer - closed stand	Sale	489
JJ8CS	8" Jointer - closed stand	Sale	1189
JWP124P	12" Benchtop Planer	Sale	339
JWBS14OS	14" Band Saw 3/4 HP - open stand	Sale	499
JWBS14CS	14" Band Saw 1 HP - closed stand	Sale	529
JWTS10JF	10" Contractor Table Saw with 30" Jet fence 1-1/2 HP	Sale	599
JWTS10CWPF	10" Contractor Table Saw with 30" Exacta fence 1-1/2 HP	Sale	749
JTAS10X501	10" Tilting Arbor Table Saw with 50" Exacta fence - 3 HP	Sale	1399
JDP17MF	16-1/2" Drill Press 3/4 HP - 16 speed	Sale	429
DC-650	Dust Collector, 1 HP, 650 CFM	319	219
JWP-15HO	15" Planer with stand and casters	1699	1229

PORTER CABLE

9444	Profile Sander Kit	220	99
9444VS	Var/spd Profile Sander Kit	207	115
690	1-1/2 HP Router 8 amp	278	149
6931	Plunge Router Base	139	82
691	1-1/2 HP Router D-handle	303	164
693	1-1/2 HP Plunge Router Base	338	184
697	1-1/2 HP Router/Shaper	418	235
698	Heavy Duty Shaper Table	238	135
352VS	3x21 v/s Belt Sander w/bag	321	175
360	3"x24" Belt Sander w/ bag	397	214
360VS	360 Sander w/ variable speed	429	229
362	4"x24" Belt Sander w/ bag	412	224
362VS	362 Sander w/ variable speed	446	239
9125	3-1/4" Planer Kit w/ case	250	145
9118	Porta Plane Kit 7 amp	400	235
505	1/2 sheet Pad Sander	249	139
97549	Top handle Jig Saw 4.8 amp w/ case & blades	275	144
330	Speed Block Sander 1/4 sheet	120	68
556	Biscuit joiner w/5556 fence .	Sale	135
557	NEW Plate Jointer with tilt fence. Includes 2" & 4" blades for use with standard & face frame plates	400	199
9647	TIGER CUB Recip. Saw	230	134
9637	Full var/spd Recip Saw 8 amp	276	148
7519	3-1/4 HP Router 2 Handle	469	258
7518	3-1/4 HP 5 speed Router	534	289
7539	3-1/4HP v/spd Plunge Router	534	289
7310	5.6 amp Laminate Trimmer	176	102
97310	Laminate Trimmer Kit comp	336	189
7335	5" Random Orbit Sander	254	139
97355	7335 w/ case & dust pick-up	274	149
7336	6" Random Orbit Sander	259	145
97366	7336 w/ case & dust pick-up	284	159
332	Palm Grip Rndm Orb Sander	133	59
333	above sander with dust bag	148	65
333VS	NEW Random Orbit Sander - variable speed	150	79
334	333 Sander with PSA pad	148	65
335	NEW Palmgrip Random Orbit Sander with dual flip pad	Sale	85
310	Production Lam. Trimmer	270	154
347K	7-1/4" "Framers" Circ Saw with plastic case	250	129
743K	7-1/4" "Framers" Circ Saw with case - left hand version	250	129
9737	Tiger Recipro Saw	307	158

New Porter Cable Cordless Nailers !

CDA250	Angle Finish Nailer 1-1/4" to 2-1/2"	500	279
CFN250	Finish Nailer 1" to 2-1/2"	500	279
CMS200	Medium Crown Stapler 1" to 2"	500	279

Porter Cable Pneumatic Nailers

BN125	Brad Nailer -18 ga. 5/8"- 1-1/4"	144	89
BN200	Brad Nailer -18 ga. 3/4"-2"	238	139
FN250A	Finish Nailer -16 ga. 1"-2-1/2"	362	189
DA250A	Nailer -15 ga. 1-1/4"-1-1/2"	412	235
FC350	Framing Nailer - clipped head	558	289
FR350	Framing Nailer - round head	558	289
RN175	Roofing Coil Nailer	504	289

Porter Cable Compressors

CF1400	1 HP, 4 gal. Pancake	Sale	195
CF1540	1-1/2 HP, 4 gallon Side Stack	Sale	295
CF2400	2 HP, 4 gal. Side Stack	Sale	319

Porter Cable Cordless Drills

9862	12V Drill Kit w/ 2 batteries	362	169
9862F	9862 Drill Kit with flashlight	Sale	184
9872	14.4V Drill Kit w/ 2 batteries	424	198

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Circle No. 92

Print this article

Scrollsawing's new frontiers

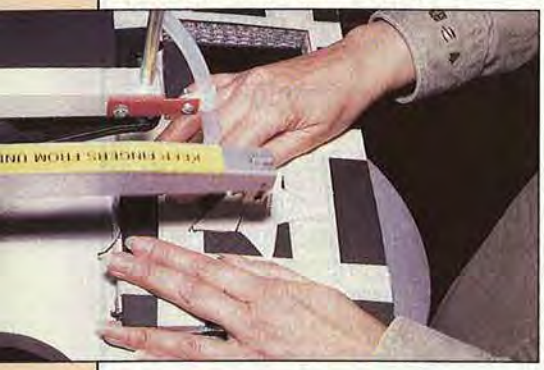
"About 97 percent of our scrollsaw sales are to woodworkers, but the other three percent includes some unconventional users," says Jim Beckerdite, director of field sales for Harrisonville, Missouri's rbindustries, Inc. The company manufactures Hawk scrollsaws, planers, sanders, and other woodworking machines.

Jim has met artists and entrepreneurs across the nation who put the company's scrollsaws to unusual challenges. One is a caterer in Reno, Nevada. She saws frozen steaks into the shape of company logos, then serves these logo steaks off the grill at business functions.

Judy Tyler, a quilter in Holly Pond, Alabama, found cutting out squares with scissors tedious. One day she watched a craftsman demonstrate a scrollsaw. Now, Tyler saws out all the squares for a quilt in about 20 minutes. Depending on the fabric and the machine, a scrollsaw can cleanly cut through 50-60 layers of cloth (see photo *left*).

Scrollsaws cut glass, too, notes Jim. Watch public television's *Stained Glass with Vicki Payne*. Payne regularly scrollsaws irregular shapes. Judy Suttlemeyer, a Laramie, Wyoming, jewelry artist, uses her scrollsaw to saw precious metals for earrings, pendants, pins, and other wearables. Jim has also heard of scrollsaws in regular use cutting coins, Corian, and marble.

Cleanly cutting cloth quilting squares requires a layer of stiff cardboard or ¼" plywood at top and bottom and a cardboard insert every 15 layers. Tape keeps the fabric from shifting.

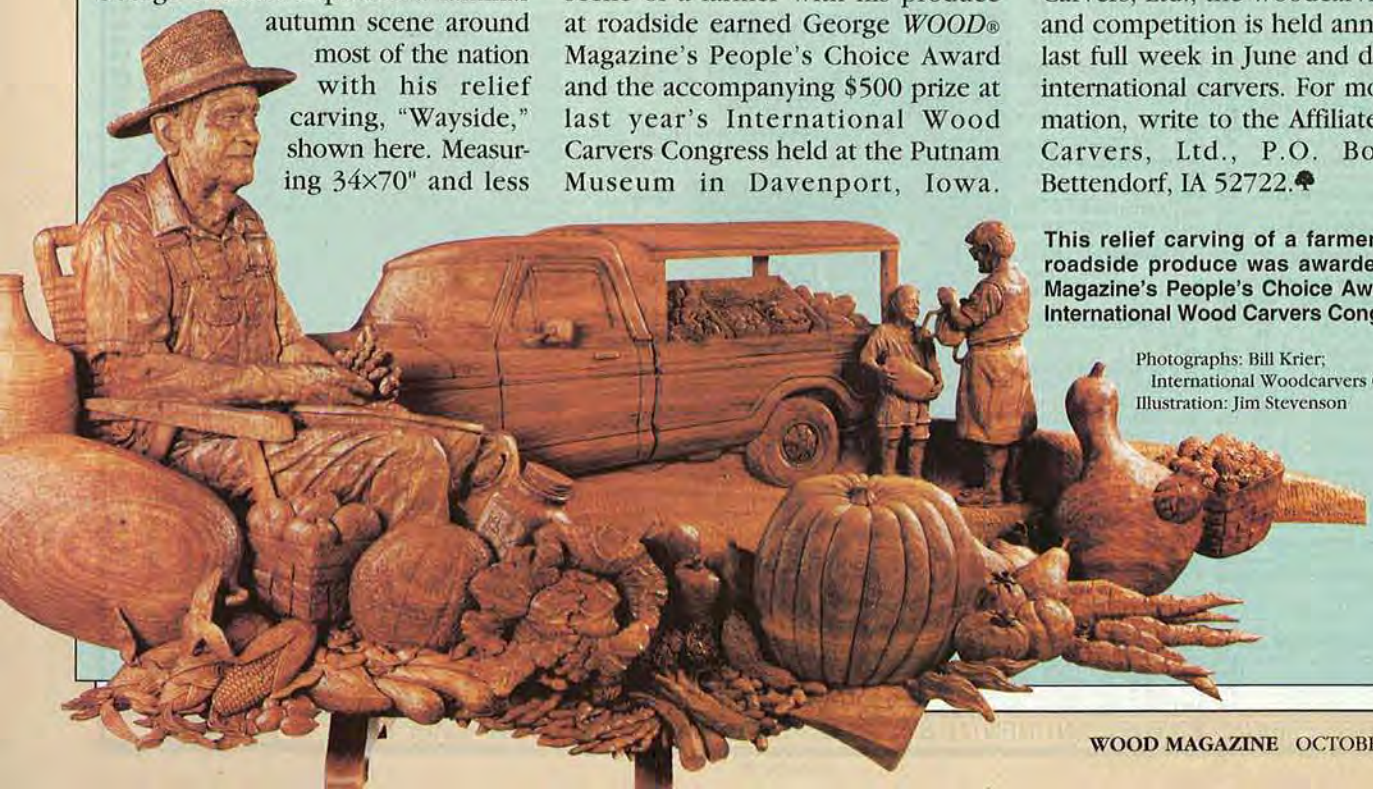


China: The Great Wall *and* lots of trees

Although China only recently rescinded restrictions on the use of lumber and wood products for building construction, the country has always had plenty of trees. According to the Western Wood Products Association, China ranks as the world's fifth largest forest land owner and eighth largest commercial timber owner. The country's greatest use of wood to date, though, has been for cooking and heating fires.

What a relief!

Raleigh, North Carolina, woodcarver George Thomas captured a familiar autumn scene around most of the nation with his relief carving, "Wayside," shown here. Measuring 34×70" and less than 2" thick, the stained basswood scene of a farmer with his produce at roadside earned George *WOOD*® Magazine's People's Choice Award and the accompanying $500 prize at last year's International Wood Carvers Congress held at the Putnam Museum in Davenport, Iowa. Sponsored by the Affiliated Wood Carvers, Ltd., the woodcarving show and competition is held annually the last full week in June and draws top international carvers. For more information, write to the Affiliated Wood Carvers, Ltd., P.O. Box 104, Bettendorf, IA 52722.



This relief carving of a farmer with his roadside produce was awarded *WOOD* Magazine's People's Choice Award at the International Wood Carvers Congress.

Photographs: Bill Krier;
International Woodcarvers Congress
Illustration: Jim Stevenson

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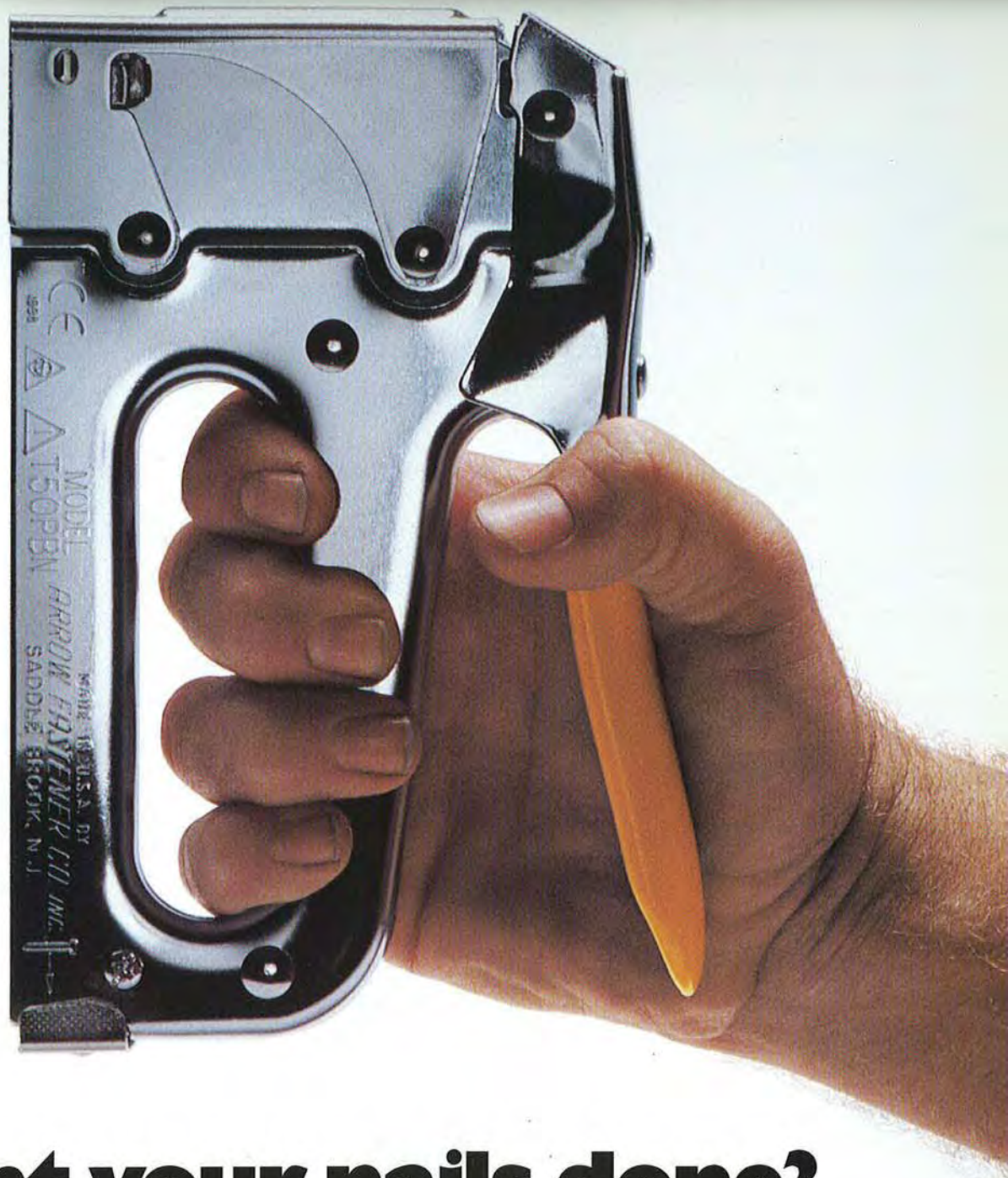

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Polish off just about any job with Arrow's versatile T50PBN hand stapler. This amazing new gun shoots six sizes of staples as well as 5/8 inch brad nails. ARROW® Plus, it's jam-proof and slip-proof.

It's made in the U.S.A. with solid steel components, not plastic parts like some other staple guns. Where can you get this handy little tool? Where else? The Home Depot.

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Intense Power

404 in/lbs of Raw Torque

25% Longer Run Time than the Competition

Industrial Metal Gear Housing

1/2" Keyless Chuck

It's a Real Saw

Huge 6-1/2" Blade for Cutting 2x's at 45°

50% Longer Run Time – 47 2x10s Per Charge

20% Faster Cutting than the Competition

50° Bevel for Maximum Capacity

Model 6343DWA

Model 5620DWA

Cuts a 2x4 at 45°

18 VOLT

6 1/2" Circular Saw & 1/2" Drill

For more information, call 1-800-4-MAKITA.

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Better Homes and Gardens®
WOOD PATTERNS
For your woodworking convenience

OCTOBER 1998 **ISSUE 108**

Dear Reader: As a service to you, we've included full-sized patterns on this insert for irregular-shaped and intricate project parts. You can machine all other project parts using the Bill of Materials and the drawings accompanying the project you're building.

Wooden Stems
Nightstand
Box-Joint Jig

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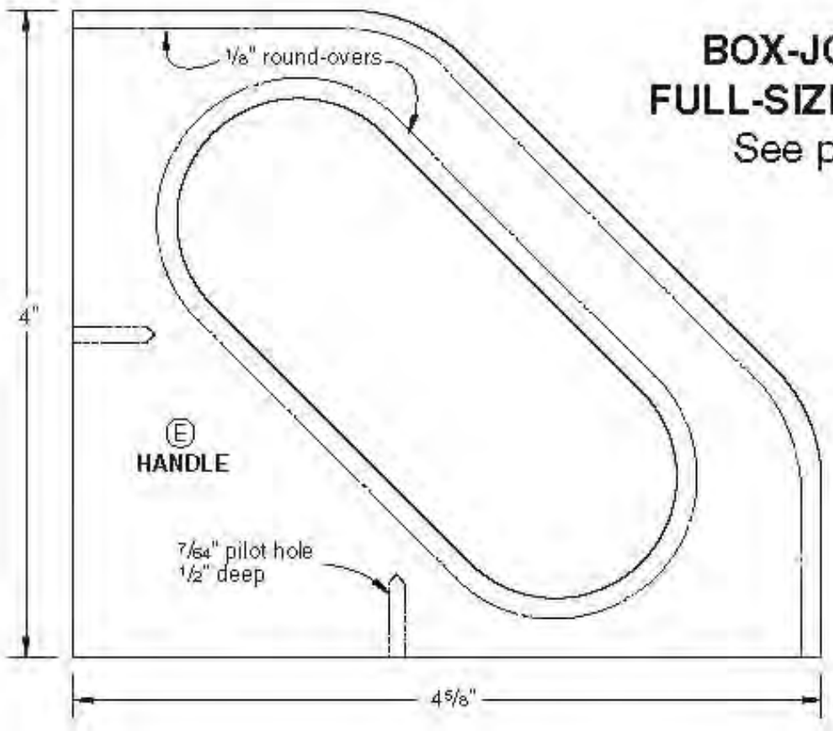
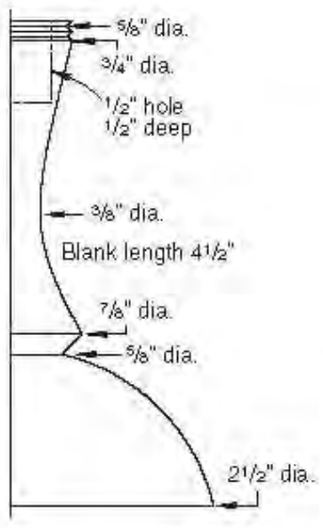
BOX-JOINT JIG FULL-SIZE PATTERN

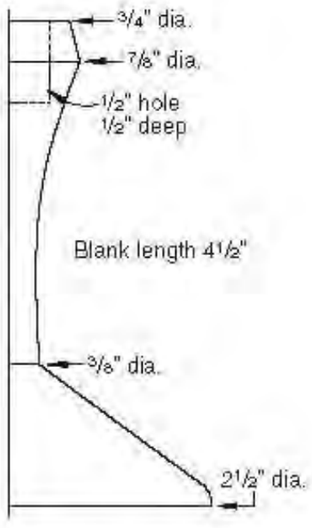
See page 44

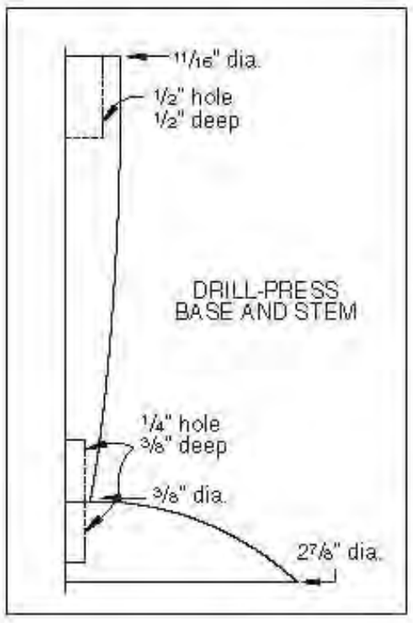


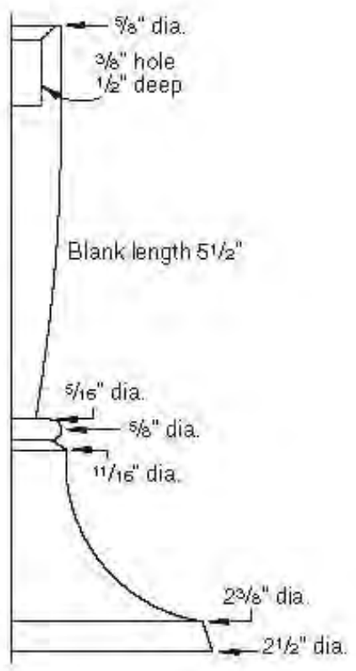
WOODEN STEM GLASSES FULL-SIZE PATTERNS

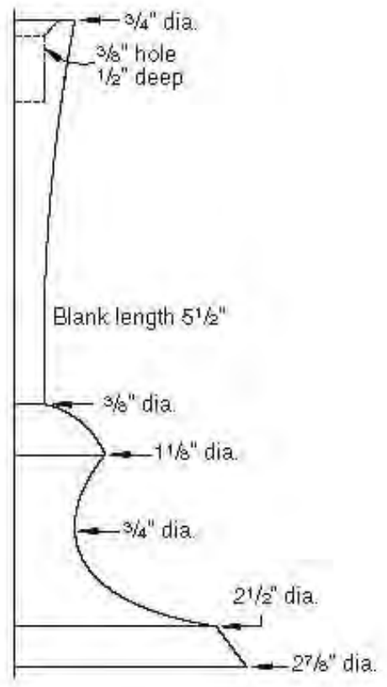
See page 74

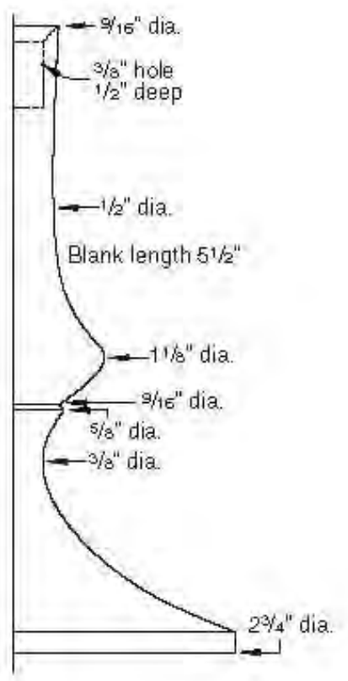


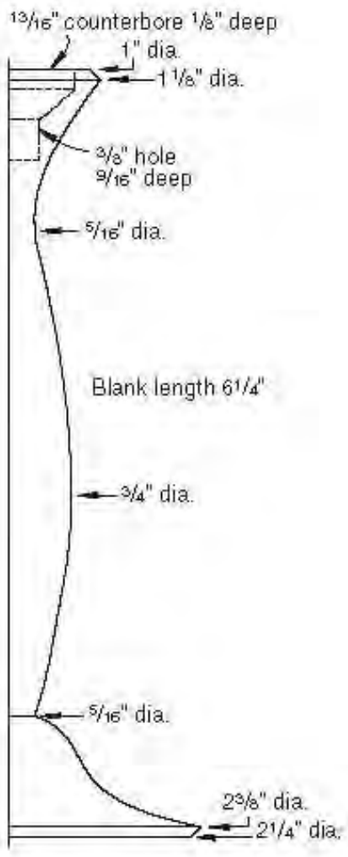


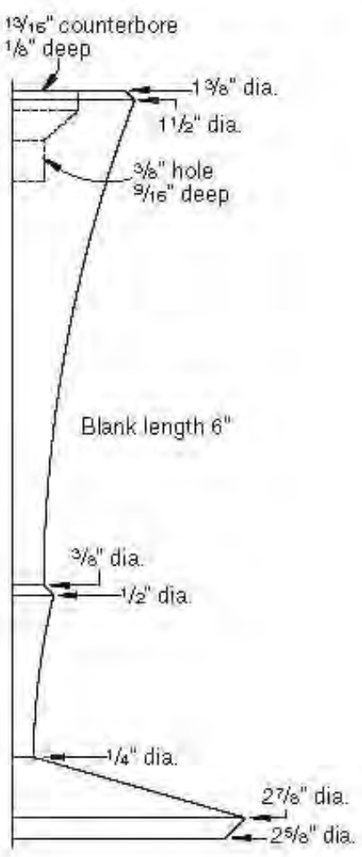


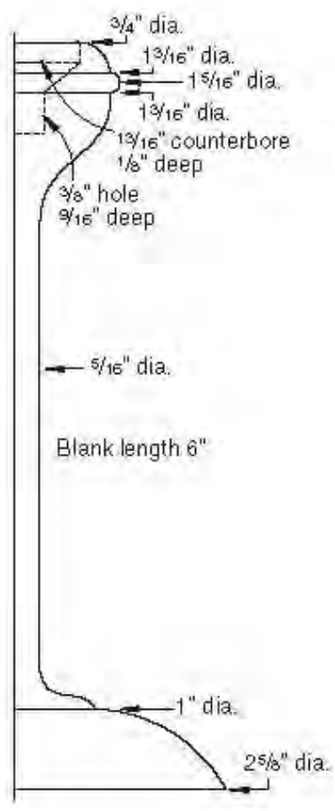


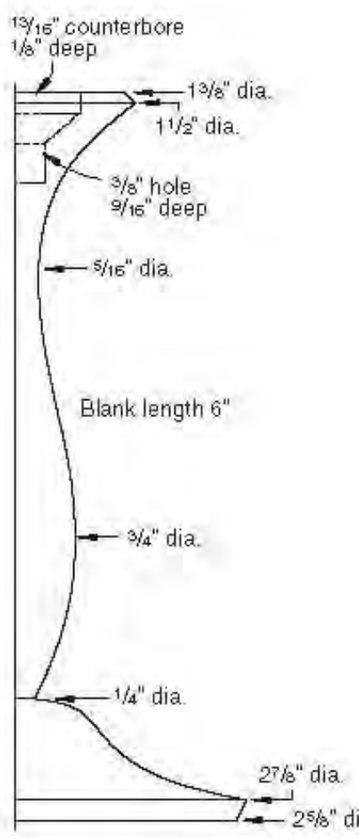


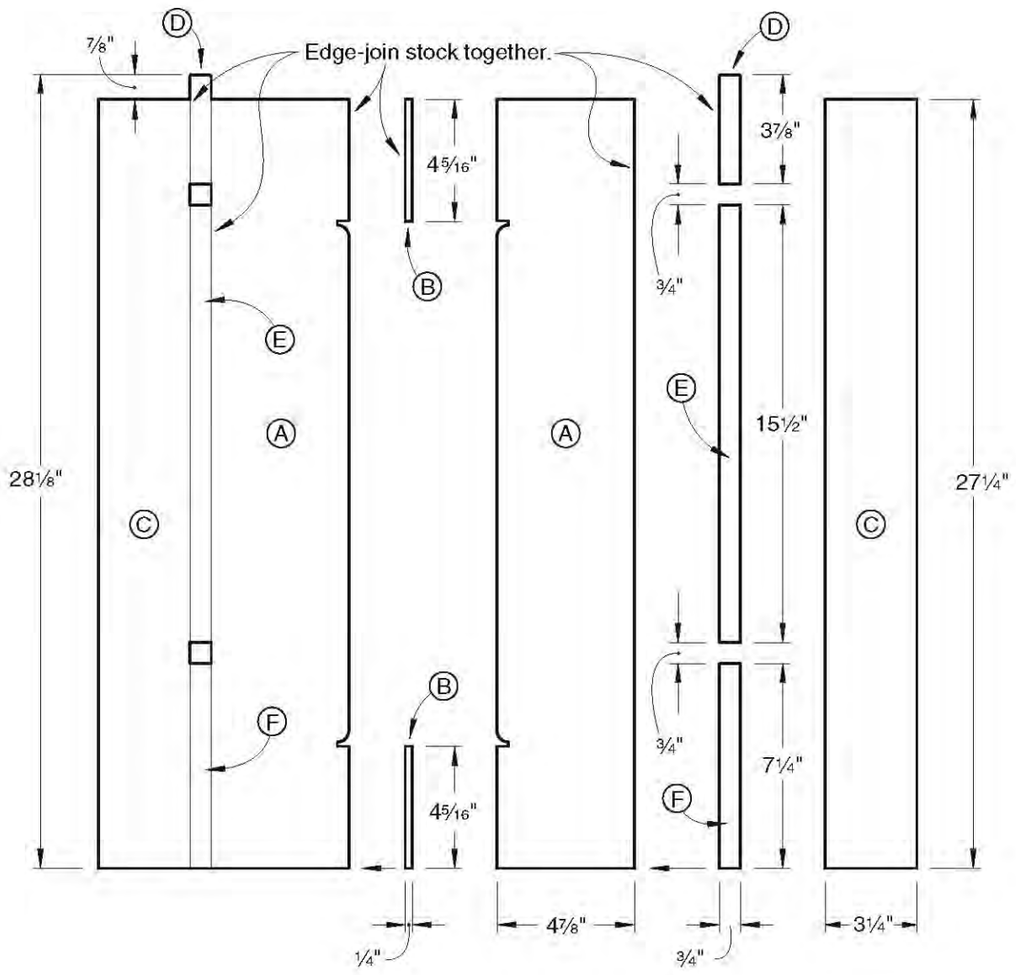




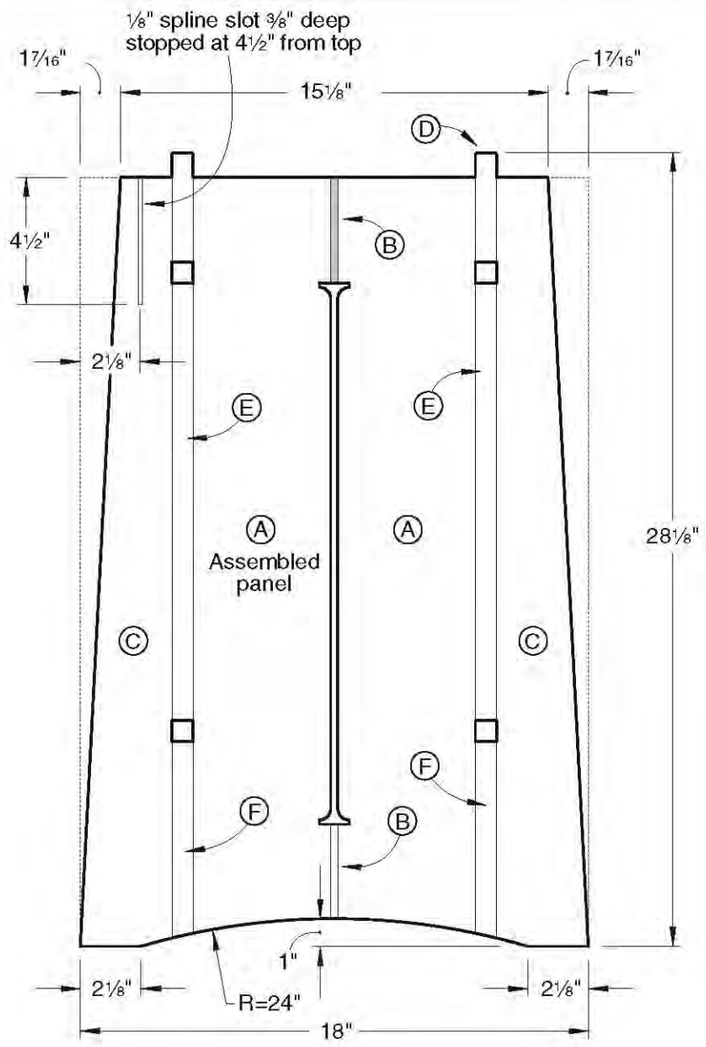




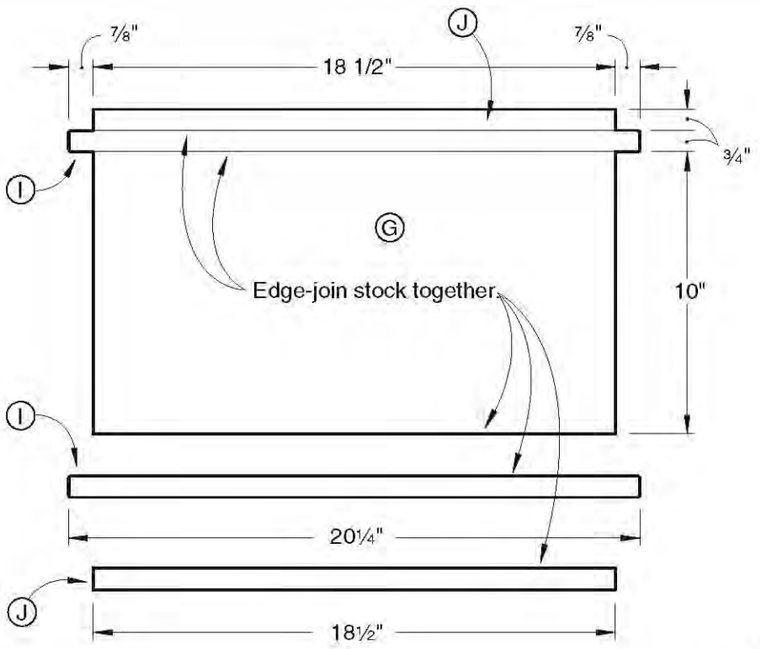




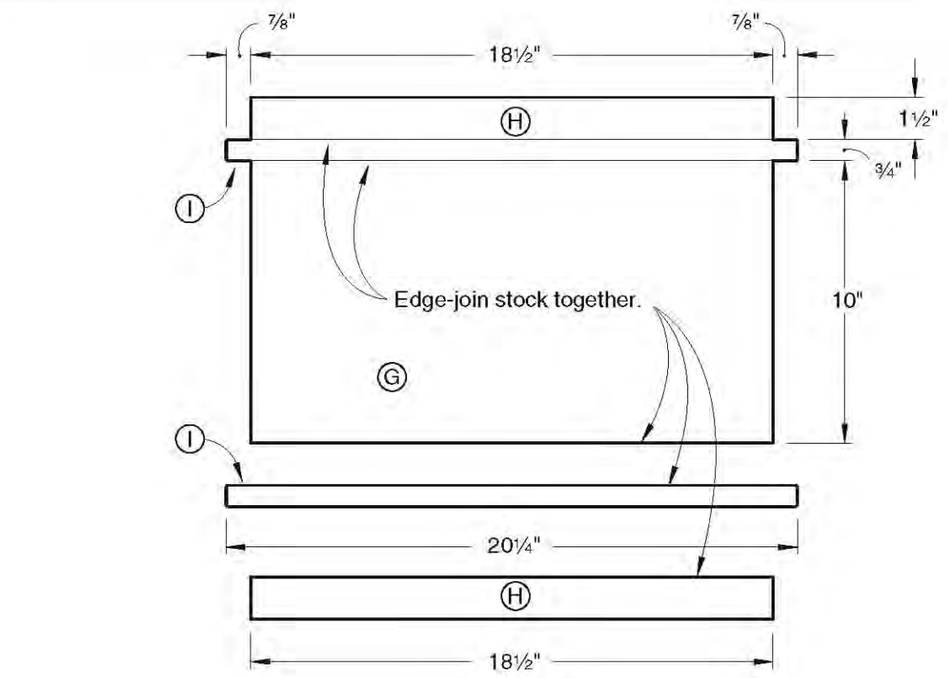
SIDE PANELS



PARTS VIEW



TOP SHELF



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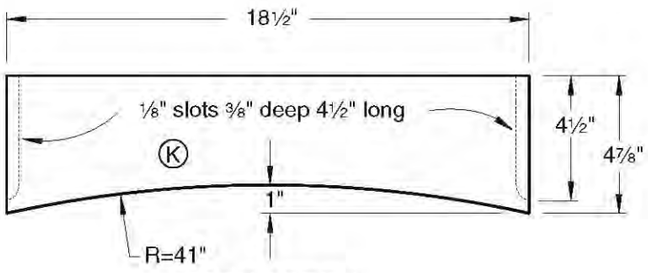
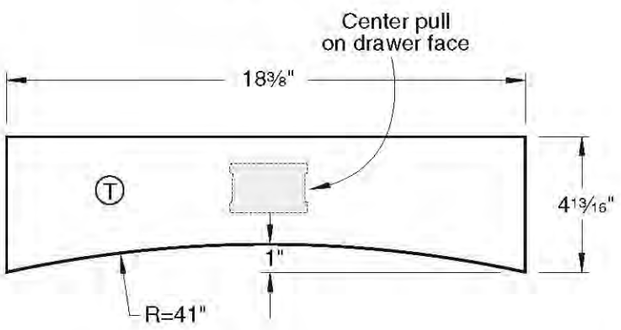
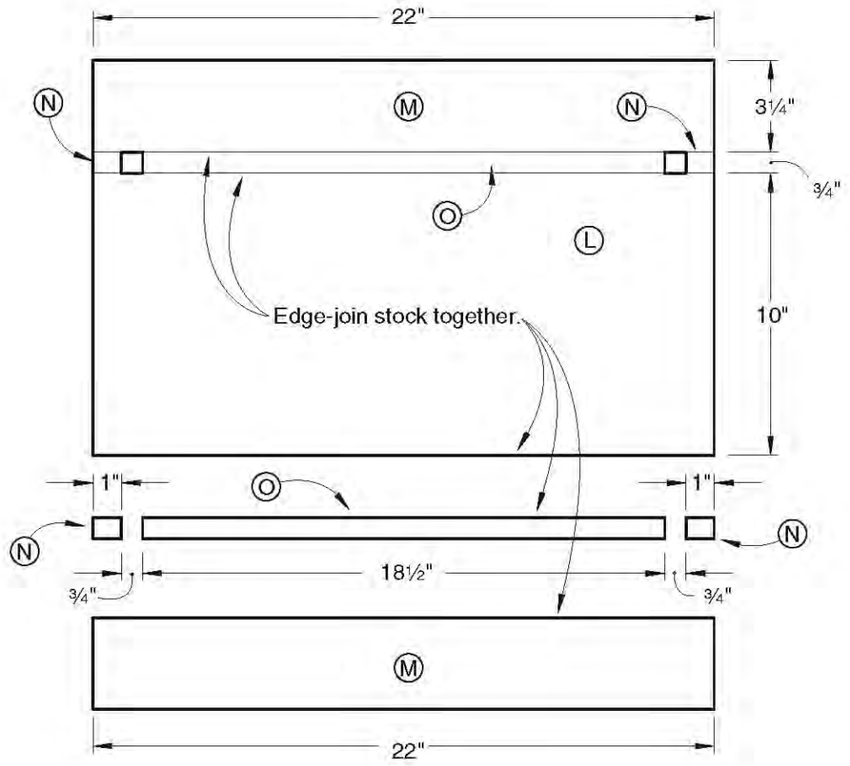


BACK APRON



DRAWER FACE



TOP

NIGHTSTAND

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